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MIDDLESEX SOUTH AND MASSACHUSETTS MEDICINE*

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IN the brief time allotted for the delivery of this address, it is quite impossible to do more than touch in a most general way on a few of the highlights in the ninety-one years of vigorous and progressive service of the Middlesex South District Medical Society, not only to the medical profession itself, but also to the twenty-six communities that are the society's component parts. From its beginning, as a unit of the Massachusetts Medical Society, as well as from earliest Colonial days, the society has always had within its ranks a group of able, progressive, vigorous and unselfish men, and in what follows an attempt has been made to describe some of the contributions that our district has made toward the advance of medicine in Massachusetts.

Following authorization by the Council of the state society, October 2, 1850, "A meeting of the Massachusetts Medical Society, residing in some thirty towns in the south part of Middlesex County, was held at Waltham on the twentieth of February [1851] to form a district medical society. . . . The following gentlemen were chosen officers: Dr. Josiah Bartlett, of Concord, president; Dr. Jonathan W. Bemis of Charlestown, secretary; and, Dr. Edward Warren, of Waltham, treasurer."

After printing this notice in its issue of March 5, 1851, the *Boston Medical and Surgical Journal*, possibly imploringly, remarked: "For the above information we are indebted to the *Daily Times* of this city. When will our medical friends learn to send such intelligence to the medical press?"

The establishment from time to time of district societies was part of the natural growth of the state society, which had come spontaneously into being in 1781. As the population of the state increased, and as new communities sprang up or older ones expanded, it was a natural sequence that the physicians in these communities should associate themselves together in local and in district societies, for there they could enjoy the advantages of social contact, report and discuss their interesting and problem cases, the worth or worthlessness of different modes of treatment, and bring to the attention of their fellows any new discoveries that might be of value.

One subject, however, seems to have been taboo, if one may judge from excerpts taken from an address by Dr. Joseph Reynolds, of Concord, at the semiannual meeting held at Waltham, November 1, 1854. Certain portions of this address are interesting, for they convey some idea of the intense feeling that existed against the homeopaths:

> One subject, we trust, will be entirely ignored, unless forced upon one's attentions by inexorable fate; we mean quackery. The profession have wasted enough of their strength upon this already. It is of no use to be eternally complaining that quacks abound; that people will employ them, that homeopathy is spreading in a particular district, and that some of its professors will persist in retaining their connection with our medical societies. The only way to put quackery down is to raise the standard of medical education, and thus keep all quackery *outside* of the profession where it will do no great harm. Towards accomplishing this result, the members of each district society, individually and collectively, should contribute their position.

Incidentally, at about this time, the parent society was concerning itself with a study of homeopathy and its tenets, with no less a committee than Drs. George Hayward, J. B. S. Jackson and Oliver Wendell Holmes. The following resolution was accepted and passed: "That a diploma from a homeopathic institution shall not be received as an evidence of medical education, [and that] attendance at the lectures at such institutions [shall not] be regarded as qualification to entitle candidates to an examination for license from the society."

*The Annual Oration, delivered before the Middlesex South District Medical Society, Cambridge, May 14, 1941.

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In the act of the legislature of November 1, 1781, by which the state society received its charter, no provision was made for the forming of local or district societies that should become integral parts of the parent society. In fact, the membership was limited to not more than seventy, nor less than ten, fellows, eleven constituting a quorum. In three years, however, it became evident that there was need for subsidiary committees, and a vote was taken in Mr. Furnass's room in Court Street on Wednesday, October 26, 1785, which provided for the "appointment of corresponding committees" in the several counties of the Commonwealth. These committees were designed to encourage meetings of physicians in their respective counties and the reporting of unusual or important cases, either verbally or by correspondence. Accordingly, committees were appointed for the following counties: Suffolk, Essex, Middlesex, Worcester, Hampshire, Berkshire, Bristol and Plymouth, Barnstable, Dukes and Nantucket, and Lincoln and Cumberland — for Maine was a part of Massachusetts until 1820. The first reference in the state society records to a report from the Middlesex Committee was under date of April 8, 1789. The entry reads as follows:

> The corresponding committee of Middlesex reported and laid on the table a copy of the Middlesex Medical Association.
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> This report, signed by Isaac Rand and Oliver Prescott, addressed to Dr. N. Appleton, recording secretary, was dated April 3, 1789, and read: The committee appointed for the County of Middlesex report the enclosed printed regulations of an association of physicians, as the best means they could devise for promoting the views of the Medical Society in the county they belong to.

The printed document, which is headed "Middlesex Medical Association," is two and a half quarto pages in length, and contains ten preambles and a set of bylaws consisting of twenty articles. Despite this excellent beginning, it is impossible to trace this Middlesex Association further.

The records of the state society contain no further reference to a Middlesex association until 1844, although the *Historical Contributions of Lowell, Massachusetts* mention the fact that the first county medical association was founded in 1829, but was disbanded in 1833. Another society, which began in 1839, was merged into the Middlesex North District Medical Society in 1844.

In 1803, the legislature removed the restriction limiting membership and provided machinery for the formation of district societies. The first application was from a group of Boston men, who requested that their society be allowed to include the "fellows residing in the neighboring towns of Charlestown, Cambridge and Roxbury." This petition was granted by the Council on February 2, 1804, but strangely enough, no further record of this group is to be found.

To obtain a proper perspective of the development of the district societies, it may be well at this point very briefly to review, in chronological order, the admission of these various units to the state society, and to note, in passing, that Middlesex South was one of the very last to become an entity. The order of admission was as follows: Worcester, 1804; Essex South, 1804 or 1805 — the exact date is not given; Berkshire, 1807 — although the petition for admission was granted, this society apparently never functioned, and another petition was granted in 1818, regular meetings beginning on July 1, 1819, and the charter being accepted by the state society on May 4, 1820; Hampshire, 1831; Bristol South, 1839; Barnstable and Hampden, 1840; Essex North, 1841; Middlesex North, 1844; and Suffolk and Bristol, 1849. The group consisting of Middlesex East, Middlesex South, Norfolk and Plymouth came into existence in 1850, as Franklin did in 1851, by redistricting and by petition. Worcester North was established on petition in 1858, and Norfolk South was admitted in 1884. Except for a few boundary adjustments, there have been no changes or additions in the last fifty-six years. One sometimes wonders why Charlestown and Brighton, parts of Boston, should be included in the Middlesex South, instead of in the Suffolk, District. The explanation is that, as territory surrounding Boston merged with the city, these districts became a part of Suffolk County. Charlestown, however, remained in the Middlesex South District, as Brighton, previously set off from Cambridge, did when it became part of Boston in 1874.

Of the many physicians in the history of the Middlesex South District Medical Society, some naturally attained more prominence than the majority of their fellows. In his delightful address, entitled "The Heritage of Middlesex South," which he delivered at our annual meeting in April, 1927, Dr. Dwight O'Hara reviewed in some detail the attainments and personalities of several of the more interesting of these earlier members. Because certain of them were so outstanding and so obviously influenced the course of medical thought and progress, — although their contributions were made before Middlesex South became an entity, — it seems proper again to speak of them here. One is impressed by the frequent occurrence, even in early Colonial days, of names with which we of recent times are familiar, and

which we instinctively associate with the best in medicine.

The name "Tufts" occupies a place of high honor in the state society's records. Simon, the elder, practiced in Medford from 1725, where he served as preceptor to General John Thomas, of Dorchester Heights fame. He was the father of Simon Tufts, the younger, who succeeded to his father's practice in 1746, and of Cotton Tufts, of Weymouth, who became one of the prominent founders of the Massachusetts Medical Society. Simon, the younger, although not a founder of the state society, early became interested in its affairs. He had a hand in designing the seal (1782), was a member of the first auditing and budgeting committees (1783), and was among the first to present a paper before the Society (1784).

John Brooks, also of Medford, studied with Simon Tufts, Jr. He served at Lexington and Concord and, later, in New York, rising to the rank of adjutant-general. He was an ardent supporter of Washington. After the war, he resumed practice in Medford with his old teacher, but became interested in politics, and in 1816 was elected governor of Massachusetts. He subsequently resumed practice and was president of the Massachusetts Medical Society from 1823 to 1825.

Dr. William Kneeland, of Cambridge, served from 1784 to 1786 as second president of the newly formed Massachusetts Medical Society. He was the first of a goodly number of Middlesex South men to be thus honored. Dr. Kneeland was one of a committee from the state society to attend the induction into office on October 7, 1783, of the newly appointed professors of the "Medical Institutions of Harvard University" — a very solemn occasion in Cambridge Meeting-House. As the state society and medical school had started at about the same time, the question of which should have charge of licensing prospective practitioners soon arose. Dr. Kneeland, as one of a committee representing the Society, had an active part in negotiating the matter, which was not definitely settled until 1793. With Simon Tufts, the younger, he also helped in the first audit of the Society's finances, and in preparation of the first budget.

Another example of father and son, both beloved physicians who influenced medical thought in this district, was that of the two Josiah Bartletts — the elder of whom, born in 1759, practiced in Charlestown, and the younger in Concord. Josiah, of Charlestown, was prominent in the reorganization proceedings of the state society in 1803, helping to draft and present the petition to the General Court for these changes. He also took part in writing the new bylaws and served on committees concerned with the formation of a district society in Boston, — "to include Roxbury, Charlestown, and Cambridge," — both in 1804 and 1809, neither of which efforts succeeded. In 1810, he delivered the annual dissertation, entitled "On the Progress of Medical Science in Massachusetts," which was regarded as "a noteworthy paper" and in which he pointed out the stimulus that the Revolution had given to medical investigation, the advantages of the army hospital department to students in medicine, and the fact that Washington had instituted in this state the first medical examinations for candidates for practice. Two years later, in 1812, he urged that the communications of the society be published in the *New England Journal of Medicine and Surgery*, which was just starting, as the official organ of the Massachusetts Medical College, with the professors of the school as its editors; in 1813, he suggested that a committee of the state society be appointed to confer with the professors of the Harvard Medical School on the best method of arranging a uniform plan of medical education.

Marshall Spring, of Watertown, had the doubtful distinction of being the first fellow to have been disciplined by the Massachusetts Medical Society. He had joined in 1784, and at the meeting of the Council on November 5, 1788, a letter was presented by Dr. James Lloyd, an outstanding physician in Boston, accusing Dr. Spring "for conducting in an improper manner as a fellow of this Society." The censors, Drs. Joseph Gardiner, Isaac Rand, Jr., and Lloyd had "after a fair impartial hearing adjudged a pupil of Dr. Spring's as not qualified for present admission to practice." According to the charge, Dr. Spring had criticized the censors and taken exceptions to their ruling, and "in a most injurious manner declared his opinion that this pupil was rejected through the influence of the subscriber [Dr. Lloyd] to gratify a personal pique and animosity." Consideration of the charges was postponed from one meeting to another, until in the presence of both accuser and accused, on June 2, 1790, the Council "voted — that all records that have been made respecting the controversy . . . be considered as expunged and done away with."

Early in his career, — he graduated from Harvard in 1762, — Dr. Spring built up a large practice in Watertown and the neighboring territory. Although a Tory in affiliations and convictions, he was among the first to arrive at the Battle of Lexington, where he gave freely of his skill. Iconoclastic in his outlook, he seems to have enjoyed the confidence of his community and to have had

many traits that endeared him to his followers. He died in 1818, at the age of seventy-six.

To have been chosen the first professor of theory and practice of physic in the Harvard Medical School, as Dr. Benjamin Waterhouse, of Newport, was in 1782, at the age of twenty-nine, is sufficient reason for his inclusion here; in addition, his introduction of Jennerian vaccination into this country in 1800 by courageously inoculating his six children with cowpox vaccine, and subsequently with smallpox, assures him a high place among our illustrious predecessors. The knowledge that he took but little interest in the actual practice of medicine, and that he "seemed always happiest when in opposition," cannot detract from the distinction of having been the instigator of a great forward step in American medicine. He died in Cambridge in 1846.

Among the more than two hundred delegates to attend the first meeting of the American Medical Association, which was held at Philadelphia in May, 1847, was a group of thirteen from Massachusetts. These gentlemen returned obviously much impressed by what they had seen and heard, and advised hearty co-operation in carrying out the measures proposed at the convention, which, they said, "would promote the welfare of the community and elevate the character of the medical profession." Resolutions were passed by the Council to the effect that it approved the formation of a national society, that delegates be appointed to attend its next meeting, and that a committee be named to determine the number of delegates to which the Society was entitled and to nominate a list of them. It is a matter of pleasant record that the Middlesex South District Medical Society had a part in establishing the agreeable relation between the national and the state associations. This was through the appointment of Josiah Bartlett, of Concord, on the above committee.

Dr. Bartlett was the first district president, having been elected on February 20, 1851. Like his father, Josiah, of Charlestown, he was a man of positive character, who enjoyed a very large practice. In fact, that of his father and his own, overlapping one another, covered a complete century. He was a councilor for many years. As president of the state society (1862-1864), he presided over one of the few annual meetings to be held, up to this time, outside Boston, that is, at the Berkshire Medical College in Pittsfield. His chief constructive interest, as president, was in furthering the efforts of his friend Dr. Henry I. Bowditch to establish a state board of health and vital statistics, but because the Commonwealth was busily engaged in war activities, the effort came to naught at this time.

Very shortly after establishment of the Middlesex South District and the organization of its medical society under Dr. Bartlett, its members took an active and influential part in the proceedings of the Council. Of course, many of the gentlemen who had previously been admitted to the state society were merely reclassified, and it was natural that the names of some of them should have appeared before, as well as after, the redistricting of 1850. Prominent among these members was Dr. Morrill Wyman, one of the most revered, best loved and illustrious of all Massachusetts physicians. During his long and fruitful life, which covered ninety-five years, medicine was the one object to which he bent all his energies. "Practitioner, student, investigator, at no period of his life, even to the end, did he cease to be interested in the great discoveries which, in his generation, added so much to the science of medicine." Since his character and attributes have been so well described by others, and since so many anecdotes have been told about him, merely a brief summary of his doings as a member of the state and district societies is presented.

The first mention of his participation in these activities was in connection with a vote by the Council, on February 20, 1848, authorizing the appointment of a committee of five to make plans for the next annual meeting, because it had become evident that the details involved in this undertaking required the services of a small, compact group. Dr. Wyman, as a member of this first Committee of Arrangements thus helped to inaugurate an important custom, which has been followed for ninety-two years and has contributed much to the pleasure and efficiency of the annual meetings of the state society. In 1850, or thereabouts, he devised the cannula and trocar used by Dr. Henry I. Bowditch in performing, on April 17, 1850, the first thoracentesis done in this country. In April, 1855, Dr. Wyman attended the annual district meeting as councilor; in 1856, he was elected vice-president and gave the annual address, "On Intestinal Obstruction, with Especial Reference to the Treatment"; in 1857, he was re-elected vice-president, and in 1864, he was elected censor.

At the annual meeting of the state society, held in Pittsfield in 1863, Dr. Wyman gave the annual discourse, "The Reality and Certainty of Medicine." In 1866, he read another paper at the first two-day meeting of the Society ever held.

By 1868, physicians throughout the state had become concerned with the malodorous conditions

surrounding the office of coroner. In February of that year, the Council directed the naming of a committee to "request of the Governor and his council, the appointment, when practicable, of medical men to the office of coroner, in the different districts of this state." The conditions leading up to this request are discussed later. Dr. Wyman was put on this important committee, which, the following October, reported back to the Council that it had seen the governor, Alexander H. Bullock, and had been assured by him that the Council's resolution would be considered, whenever there was a vacancy in the office of coroner. Although no immediate change was made in the system, the matter had been brought into the open, and the way paved for the abolishment, nine years later, of an antiquated, inefficient and corrupt system.

The library of the Massachusetts Medical Society, in the course of its ninety years' existence, passed through various vicissitudes. Provisions were made for it in the first bylaws of the Society, adopted April 17, 1782, and regulations put in force that today would be regarded as Hitlerian in severity. The library, apparently, was never very flourishing, never had many volumes, and was relatively little used. When the librarian reported, in 1871, that no one had consulted the books during the previous year, it was proposed that the published volumes of the society be sold to members at twenty cents a volume, and that the remaining books be deposited in some public library. Fortunately, the Boston Public Library became the repository of most of them. After this provision had been carried out, however, there still remained in the society library several copies of *Medical Communications* and other volumes. The priceless value of these books, manuscripts and records was recognized and stressed by Dr. Henry I. Bowditch, Dr. Morrill Wyman and others, with the result that in February, 1874, the care of this material was entrusted to them and to Dr. Francis Minot, as a special committee, which in turn, and as a happy sequel, stimulated Dr. James R. Chadwick to found the Boston Medical Library in 1875.

The Cambridge Hospital was incorporated in 1871, but remained open only a year because of a lack of funds and interest. In 1874, as president of the corporation, Dr. Wyman headed a committee to raise money. He had grave doubts of the success of the venture, because of the services being rendered by the Massachusetts General Hospital to Cambridge, as well as to Boston, but he accepted and, as Rev. Dr. Francis G. Peabody said at the dedication of the Morrill Wyman House on October 29, 1929, "brought to the task all that energy and intelligence which he always so freely placed at the service of his fellow citizens."

When the hospital was dedicated, on April 29, 1886, Dr. Wyman, still president, gave the address. He continued in this office until 1892. His last official act as a councilor was at the October meeting in 1902, when at the advanced age of ninety, but still keenly aware of values, he introduced a motion that an index be made of the *Medical Communications* of the Society, which had been published since 1790. The forty-page pamphlet, issued the next year, indexed both authors and subjects and has saved much time and labor to those interested in the catalogued material. Morrill Wyman House, in its quiet setting by the Charles, is indeed a fitting memorial to the beloved physician whom it honors.

Reference has already been made to the archaic and inefficient coroner system that was in operation in the State until 1877, when it was replaced by the present, and much more satisfactory, medical-examiner system. Its origin, workings and inadequacies, and the contrasting efficiency of the medical-examiner system have been described by Dr. Timothy Leary, as follows:

> The coroner is of purely English derivation, and the system was inherited by us from our Anglo-Saxon forebears. "The office of Coroner is of so great antiquity . . . that its commencement is not known."
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> The first formal statute after Magna Charta dealing with the Coroner is that of Edward the Confessor [*sic*] in the year 1276. His duties were, with others, . . . "to take a View of the Body and the Wounds and the Cuts, . . . [and by inquiring] whether the Killing was by Felony or Misadventure . . . of the Manner of the Killing, with what Weapon, and all of the Circumstance."
>
> With the passage of time . . . his duties were largely limited to determining the cause and manner of death, where death was supposed to be due to violence, and to cataloguing and evaluating property, which was deodand [gift of God], or forfeited in connection with a violent death. . . .
>
> In the early days in England the office of coroner could be held only by "lawful and discreet knights." In modern times the appointees, both in England and here, have often owed their preference to office to political favor, and the results have been sometimes unfortunate. In Massachusetts, coroners were appointed by the governor and council and no limitation was placed on their number. On petition to the governor and council, any citizen, if he met with their approval, could become a coroner. The result of this procedure in the county of Suffolk was a series of scandals, through the appointment of unfit men, which culminated in 1877 and led to joint action by the profession and the bar, . . . for the reform of the evil.

As pointed out by Theodore H. Tyndale, a lawyer who represented the bar:

> London with its enormous population, had four coroners; New York with a population three times that of Boston had four, with one medical deputy each; Brooklyn, with a population one third to one half greater, had two; Philadelphia, New Orleans, and Chicago, *two* each; San Francisco, Baltimore, Washington, and Cincinnati but *one* each — a total of twenty-four for all these large cities taken together.
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> Suffolk County, consisting chiefly of Boston, had forty-seven coroners, . . . almost twice as many as all the above named cities combined; of the forty-three coroners in Boston, thirty-one were regular physicians and members of the Massachusetts Medical Society, two were registered as members of the Massachusetts "Eclectic Medical Society," seven were what were known as "other physicians," while four were non-professional gentlemen. Of these last, one was an auctioneer, another an insurance agent and broker, a third vended patent medicines, while the fourth figures simply as "notary public and coroner."

Facing this situation, in October, 1876, the Council voted that the President appoint a committee of five "to take into consideration the defects of the present laws relative to the appointment and practices of coroners, so far as these defects involve the Medical Profession, and to report . . . what action, if any, is advisable." The committee named consisted of an unusually strong group — Benjamin E. Cotting, J. C. How, W. L. Richardson, J. Collins Warren and William W. Wellington, of Cambridgeport. That they gave very earnest and thoughtful consideration to their problem, working in conjunction with Mr. Tyndale, is evidenced by the searching report they submitted to the Council on February 7, 1877. This report, too lengthy to be presented in detail, was well summarized by an editorial in the *Boston Medical and Surgical Journal*, which stated that:

> . . . The [coroner] system is a remnant of past and obsolete usages, and is wholly unsuited to the needs of the present times; that the powers pertaining to the office of coroner are many, unrestricted, and dangerous, and that perversion of them is already notorious, the manner in which inquests are conducted being too frequently objectionable; that the number of coroners possible under the law is unlimited, and at present the appointments are far too numerous and easily obtained, many of those now holding office being totally unfit for the place, and the deeds of some being scandalous; that no redress is practicable, except through a very tedious process, "an address of both houses of the legislature to the governor," one too complicated ever to be resorted to; that the system is a very expensive one and "even when an inquest is unexceptionably made, it is absolutely useless as an aid to justice, and what is still worse, may in fact favor the escape of the guilty."

The report itself ended with the recommendation that the president name a committee of five to cooperate with committees of other interested associations, or persons, to present the matter to the legislature, and to seek reform. The same committee was appointed as before, with the addition of Dr. William Cogswell, of Bradford, president of the Society, as chairman. So energetically did they perform their task, working in conjunction with other interested groups, that on May 9, 1877, the governor signed the present Medical Examiner Act, entitled "An act to abolish the office of coroner and to provide for medical examinations and inquests in cases of death by violence." This act has stood the test of sixty-four years, and has always operated for the interests of the public.

That the members of the Middlesex South District Medical Society had long been concerned with the inadequacies and abuses of the old system is evidenced by occasional entries in the records. In April, 1864, those attending the meeting expressed pleasure that Dr. Francis H. Brown, of Cambridge, had been appointed coroner for the county and "trusted that this was the beginning of a change which would extend throughout the whole Commonwealth, until every district should be represented by a medical officer as active and competent as this gentleman." And again, in 1869, "The subject of autopsies ordered by coroners and the collection of the established fees was introduced. After an animated discussion, a committee of three was appointed to wait upon the County Commissioners and to discuss the subject with them with a view to establishing a basis for future action in such cases." Because of this interest, it was but natural that when the matter came to a head in the state society, the president should have chosen a representative from Middlesex and one who had been active in affairs of the district, Dr. William W. Wellington, of Cambridgeport. Dr. Wellington graduated from Harvard in 1832, and practiced in Cambridgeport all his life. His father had for a long period commanded the principal practice in the whole northern district of Cambridge. Dr. Wellington is described as a scholar, as an outstanding physician, and as taking an active interest in public, as well as in professional, affairs. He was, for example, for many years secretary of the Cambridge School Committee; in fact, he was sometimes referred to as "The Committee." During the two decades 1850 to 1870, his name constantly appears in the district society's records: as one of the first secretaries, as councilor, as vice-president, and in 1862, as president. For several years after that, he served as commissioner of trials. He gave the annual address before the state society in 1870, and the next year became one of the incorporators of the Cambridge Hospital. Dr. Wellington was among those who opposed admission of women to the state or district societies. This matter first arose in June,

1867, when the trustees of the Massachusetts General Hospital requested an opinion from the Council concerning the expediency of admitting female students to visit its wards. The vote of the Council, forty-nine to seven against, left no doubt where it stood; and, for good measure, it also disapproved the admission of "females" to medical schools. Dr. Burrage suggests that the use of the word "female" in this instance represents a possible belief in Kipling's dictum that "the female of the species is more deadly than the male."

In October, 1872, Miss Susan Dimock, a native of North Carolina, applied for admission to the state society. She had, in 1866–1867, studied medicine at the New England Hospital for Women and Children in Roxbury, but because no medical school here would admit her, had gone to Switzerland, where she graduated from the University of Zurich in 1871. Returning to Boston, she became head of the above-mentioned hospital, and in 1872 established the first training school for nurses in the United States. Dimock Street, Roxbury, was named for her. The question of Miss Dimock's eligibility was referred to a committee, of which Dr. Wellington was a member. The majority recommended that she be allowed to take the examination, but at Dr. Wellington's suggestion the matter was referred to legal counsel for guidance. On the advice thus obtained, "the committee reported in 1873, that in their opinion the society had the power to admit, or refuse to admit, females to membership," whereupon the Council voted that the censors be instructed not to admit them.

There the matter rested until June, 1875, when another committee was appointed to report whether some plan might be devised whereby women thoroughly educated in medicine and surgery might receive the rights and privileges of fellowship. This committee's report in October still showed a division of opinion, and Dr. Wellington's motion on behalf of the minority, recommending indefinite postponement, was adopted, after rather lively discussion.

The next move came as a result of resolutions passed in October, 1877, by the Middlesex South District Medical Society and presented to the Council in June, 1878. These resolutions favored granting women the privilege of examination and admitting to fellowship those properly qualified. This vote suggests that there must have been many members in his district who disagreed with Dr. Wellington's stand. No action was taken on the recommendation of the Middlesex group, however, until June, 1879. Meanwhile, a questionnaire had been sent to all members of the state society, to obtain a general expression of sentiment in regard to admitting women to fellowship. Of the replies received, 71 per cent favored some form of recognition, and 28 per cent were opposed to any action whatsoever. The committee appointed by the president in June, 1879, to consider the Middlesex South resolutions presented, the following October, as seemed to have become customary, both majority and minority reports. Signing the former was Dr. Alfred Hosmer, of Watertown. The minority report, however, instructing the censors to admit women for examination was the one finally adopted. But despite this vote, many objections were raised, and through a series of parliamentary maneuvers, final settlement was delayed to June, 1882. At this time, after a struggle of fifteen years, the society voted to grant to properly qualified women the same privileges as to men.

In 1869, the legislature, after many requests from the state society, created a board of health, the first to be established in the United States. So efficiently did it operate, under the chairmanship of Dr. Henry I. Bowditch, that it served as a model for the rest of the country. Because it was so influential, a brief review of the events leading up to its establishment may be of interest.

Agitation for recognition of, and action regarding, public-health problems began in 1839–1840, with the report of a committee to the Council pointing out the necessity of correctly reporting all births, deaths and marriages. An act passed by the legislature in 1842, although apparently not so far reaching as the committee wished, "at least prepared the way for a more perfect system hereafter." On May 2, 1849, the legislature, at the instance of the American Statistical Society, seconded by the Massachusetts Medical Society, authorized the appointment of a committee to make a sanitary survey of the State. The commission, made up of laymen, sought and received assistance from the Council, especially regarding nomenclature of diseases and causes of death. The report of this committee, published in 1850 and spoken of as "a remarkable document," subsequently became the basis of all future health legislation. In 1857, it was proposed that each fellow make, to the secretary of his district society, an annual return on a common form of his cases of the preceding year; this report was to be abstracted and delivered to the secretary of the parent society. Because reports were received from about only one sixth of the men in active practice, the plan was modified the next year so as to provide for the registration of only "zymotic diseases," now

known as contagious diseases. These reports, covering the years 1857 and 1858, appear in the *Annual Transactions* for 1860.

In February, 1861, the state society seconded the petition of the Boston Sanitary Association to the legislature, for the establishment of a state board of health, which should have charge of "the sanitary interests of the people," and the registration of births, marriages and deaths. Anson Hooker, of Cambridge, active for many years in Middlesex South affairs, was a member of the committee representing the Massachusetts Medical Society. The legislature disregarded this petition, as it did others submitted in each of the next two years, for the "establishment of a state sanitary commission." Despite these rebuffs, however, the Society continued its pressure year after year, until finally in 1869 the legislature succumbed, and as already pointed out, set up the first board of health to be established in the United States. This board, working in conjunction with the state society, immediately became an active influence in bettering health conditions. It continued to operate as an entity until 1879, when the legislature, against the vigorous objections of Dr. Bowditch and rather shortsightedly, merged it with the State Board of Health, Lunacy and Charity. Dr. Bowditch resigned in protest, and a year later Dr. Henry Pickering Walcott, of Cambridge, was chosen health-officer. He filled this position until 1884, when he was made chairman of the Section on Health. Apparently realizing its earlier mistake, the legislature in 1886 separated the health department from the others, making Dr. Walcott its chairman. Under his able guidance, and that of the secretary, Dr. Samuel Abbott, of Wakefield, the board made great advances and became noted throughout the country. Dr. Walcott resigned in 1914, after a distinguished service of thirty-four years, when the old board became the present Department of Public Health.

That Dr. Walcott was essentially an administrator is attested by the many public offices he held. An austere and dignified presiding officer, he served for many years as chairman of the Metropolitan Water and Sewage Board, as chairman of the trustees of the Massachusetts General Hospital, as overseer, and in 1900 and in 1905, as acting president of Harvard College. He was the state society's orator in 1889, and its president from 1896 to 1898. During his term, the censors' examination of candidates in November and May was established. He and Dr. W. W. Wellington were the only physicians among the seven incorporators of the Cambridge Hospital, and in 1892, Dr. Walcott succeeded Dr. Morrill Wyman as president of its trustees, serving until 1917. He will long be remembered as a gentleman who brought great honor to his district and state societies and remarkable administrative ability to the many positions of trust he was called on to fill.

To have served as councilor for approximately fifty years, and never to have missed an annual meeting in a long lifetime, is a rare distinction. Such was the record of Dr. Edmund H. Stevens, of Cambridge, who was a familiar figure to most of us up to the time of his death, two years ago, in his ninety-fourth year. Graduated from Harvard Medical School in 1867, he soon became a protégé of Morrill Wyman, with whom for many years he was intimately associated, and thus quickly acquired a place of prominence in his community. His name first appears as attending Council meetings about 1880. With Dr. John T. G. Nichols, he was appointed in 1886 one of the two first visiting physicians at the newly opened Cambridge Hospital. Primarily interested in surgery, he pioneered in this branch, along with Drs. Alfred Worcester, Edward R. Cutler and Henry O. Marcy. In association with Drs. Fred C. Shattuck and Samuel B. Woodward, as nominating councilor, he had a hand over a long period in the selection of properly qualified men for presidency of the state society.

In February, 1914, it was suggested that the state society abandon the separate publication of its proceedings and communications, and that, so far as possible, it publish these and all other official matters only in the *Boston Medical and Surgical Journal*. Dr. Stevens was a member of the special committee that studied and advised acceptance of the plan. When the affiliations became effective on July 1, 1914, the Society publications, begun in 1790, ceased as independent issues.

Malpractice defense and indemnity insurance are closely allied. The basis of the former in this state is an act adopted by the Massachusetts Medical Society in 1908, which follows the practice of many other state societies. It provides, under definite rules, for the defense, by the Society, of fellows against suits for malpractice, without expense to themselves. It does not, however, provide for the payment of any judgment rendered against a fellow. Because of an almost prohibitive rise in malpractice insurance rates in 1921, a movement was started to have the society provide indemnity insurance, but since its charter contained no such provision, other plans had to be considered. In October, a committee, of which Dr. Stevens was a member, was appointed to study the whole problem. Their conclusions, submitted two months later and embracing the plan now in

operation, were adopted. The plan seems to have worked satisfactorily.

A recent description by Dorothy Thompson of Winston Churchill applies so well to Dr. Stevens that I take the liberty of quoting it here: "There was something perennially young about him, as there is always something youthful about those who have done what they wanted to do, and have been happy. He had had a good life — the best life any man can have: a life of action and a life of intellect."

It is of interest to note that, in its one hundred and fifty-eight years of existence, the Massachusetts Medical Society has chosen as president no less than nine men from the Middlesex South District, whose combined terms equal eighteen years, and that sixteen of its one hundred and thirty-one orations have been delivered by men from this district. These men are as follows:

PRESIDENTS FROM MIDDLESEX SOUTH

William Kneeland	Cambridge	1784–1786
John Brooks	Medford	1823–1825
Josiah Bartlett	Concord	1862–1864
Alfred Hosmer	Watertown	1882–1884
Henry P. Walcott	Cambridge	1896–1898
George W. Gay	Chestnut Hill	1906–1908
Alfred Worcester	Waltham	1919–1921
Enos H. Bigelow	Framingham	1923–1925
Charles E. Mongan	Somerville	1935–1937

ORATORS FROM MIDDLESEX SOUTH

John Brooks	Medford	1808
Josiah Bartlett	Charlestown	1810
Rufus Wyman	Charlestown	1830
William J. Walker	Charlestown	1845
Luther V. Bell	Somerville	1848
Horatio Adams	Waltham	1858
Morrill Wyman	Cambridge	1863
William W. Wellington	Cambridgeport	1870
Henry P. Walcott	Cambridge	1889
John T. G. Nichols	Cambridge	1893
Alfred Worcester	Waltham	1895
Zabdiel B. Adams	Framingham	1897
John L. Hildreth	Cambridge	1906
Walter E. Fernald	Waverley	1912
Charles F. Painter	Newton	1925
Walter B. Cannon	Cambridge	1927

A detailed description of many of the other contributions made by members of Middlesex South District Medical Society to the progress of medicine in Massachusetts is impossible. Among them, to mention only a few, were the activities of G. J. Townsend, of Natick, in promoting the public-health and medical-practice acts; those of S. W. Abbott, of Newton, known for his contributions to the study of smallpox; those of George Curtis, whose administration as health officer in Newton for many years served, and will continue to serve, as a model for other cities; those of Godfrey Ryder, of Malden, chairman of a committee that in 1913 revised the Malpractice Act; those of Edward Cowles, of Waverley, under whose guidance McLean Hospital became the foremost semi-private institution of its kind in the country; and, finally, the long and efficient service rendered by Thomas M. Durrell, of Somerville, and George L. West, of Newton, as medical examiners, each of whom gave twenty-eight years to this work.

Thus, the Middlesex South District Medical Society, starting out on its ninety-second year, may look back on its accomplishments with a certain amount of satisfaction and with the realization that as one of the units of the state society it has contributed its share toward the betterment of medicine in Massachusetts. And the future is bright with the assurance that the present members, inspired by the deeds of their predecessors, will meet the challenge and strive for still greater service.

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THE HYPERACTIVE CARDIOINHIBITORY CAROTID-SINUS REFLEX AS AN AID IN THE DIAGNOSIS OF CORONARY DISEASE

Its Value Compared With That of the Electrocardiogram

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BROOKLYN, NEW YORK

IN a recent communication, I[1] pointed out that slowing or stoppage of the heart induced by pressure on the carotid-sinus region may be used as an aid in the diagnosis of coronary disease. This assumption was based on a study of 1886 patients on whom the test was performed. The findings in this series corroborated my previous observations[2-4] that the cardioinhibitory reflex occurs much more frequently and in higher degrees of response in males than in females and in advancing age, conditions in which coronary disease is most prevalent. In the presence of demonstrable coronary disease, the reflex occurred oftenest and in the highest degrees.

The practical value of the test in the diagnosis of coronary disease was demonstrated in a number of cases. In many, a positive test was the only evidence of the presence of such disease at the time the test was performed. The following case is an example.

CASE 1. A 35-year-old man began to experience recurring left precordial pain, mainly after exertion. Physical examination 4 weeks after its onset showed nothing abnormal. The size and shape of the heart were normal, the rate was about 80 per minute, and the rhythm was regular. The sounds were of good quality, and no murmurs were heard. An electrocardiogram (Fig. 1*A*) likewise showed nothing abnormal. Pressure on the right carotid-sinus region, however, resulted in stoppage of the heart for several seconds. Pressure on the left yielded considerable slowing. This, together with the subjective symptoms, suggested the presence of coronary disease, even though no other evidence was present. Six weeks later, the patient developed a sudden spontaneous attack of retrosternal pain radiating to the left arm, which lasted all night. The pain was not relieved by nitroglycerin but required morphine for its relief. An electrocardiogram obtained 2 weeks after the attack (Fig. 1*B*) showed definite changes in the 4th precordial lead characteristic of infarction. The sedimentation rate of the blood cells was 18 mm. at 30 minutes and 24 mm. at 1 hour, which corroborated the diagnosis.

In occasional cases, a markedly hyperactive cardioinhibitory carotid-sinus reflex was present during an acute stage of myocardial infarction, and on recovery, cardioinhibition was greatly diminished. The following case is illustrative.

CASE 2. A 63-year-old woman, who had always been well, except for a low-grade hypertension, developed shortness of breath and precordial oppression on exertion. This became much more marked after an episode of severe spontaneous precordial oppression lasting about 30 minutes. It was accompanied by a drop in systolic blood pressure from 190 to 115. Examination 1 week later showed slight left ventricular enlargement and moderate dilatation of the aorta. The heart rate was 90, and the rhythm was regular. The first and second heart sounds were greatly diminished in intensity, and there was a rough, short systolic murmur between the 3rd left costosternal junction and the apex. The lungs showed slight congestion at both bases. The electrocardiogram (Fig. 2*A*) showed low-voltage T waves in Lead 1, some depression of the RT segments and diphasic T waves in Leads 2 and 3 and abrupt QRST take-offs above the isoelectric line, with diphasic T waves, in Lead 4. The blood-cell sedimentation rate was 15 mm. at 30 minutes and 24 mm. at 1 hour. The blood pressure was 144/96. The findings definitely indicated recent myocardial infarction. Pressure on the right or left carotid sinus resulted in stoppage of the heart for several seconds.

The patient was seen again 2 months later, when the heart sounds were improved and the murmur had disappeared. The blood pressure was 162/98. The electro-

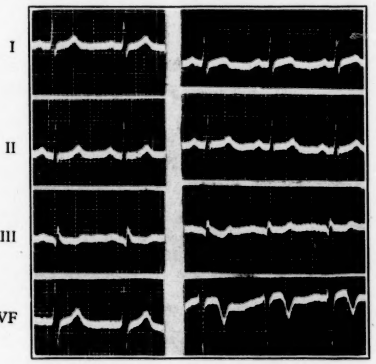

FIGURE 1.

A — *normal electrocardiogram.* B — *electrocardiogram from the same patient eight weeks later and two weeks after an attack of coronary occlusion. The T waves in Lead 1 and the QRS complexes in Lead 3 are of lower voltage. The R waves in Lead 4 are small, and the T waves are markedly negative, whereas previously they were positive.*

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cardiogram (Fig. 2*B*) showed positive T waves in Leads 1, 2 and 3, and markedly negative T waves in Lead 4. The RT segments in Leads 2 and 3 were slightly above the isoelectric line and rounded, and there were some changes in the QRS complexes in Lead 4. Carotid-sinus pressure at this time yielded marked slowing (+++) but no stoppage of the heart.

The patient was seen again 2 months later, when her condition had further improved. There was no precordial pain, and the heart sounds were moderately accentuated. The blood pressure was 170/94. The electrocardiogram (Fig. 2*C*) showed a slightly increased voltage of the T waves in Lead 1 and diminished negativity of the T waves in Lead 4. Carotid-sinus pressure at this time resulted only in moderate slowing (++).

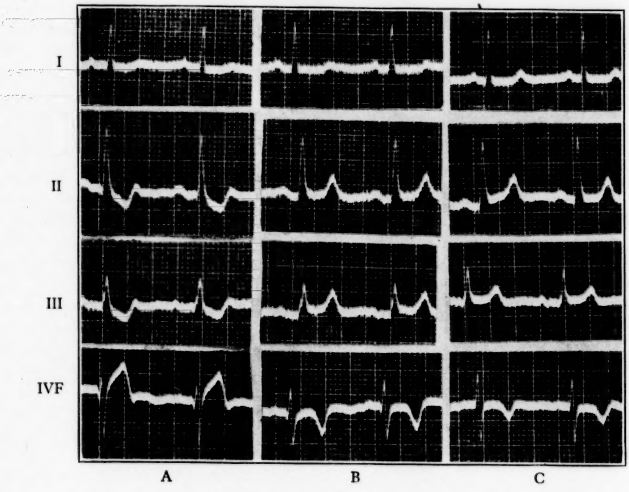

FIGURE 2.

A — *electrocardiogram one week after an episode of acute coronary occlusion. Diphasic T waves are noted in Leads 2, 3 and 4.* B — *electrocardiogram two months later. The T waves in Leads 2 and 3 are positive and in Lead 4 markedly negative. Changes are also noted in the QRS complexes in Lead 4, and in the QRS-T segments in Leads 2, 3 and 4.* C — *electrocardiogram two months after* B. *Trivial T-wave changes are noted in Leads 1, 3 and 4, indicating a practically static condition, with some improvement.*

In many cases, not only were the physical and electrocardiographic findings normal but even the subjective symptoms were not typical, and a hyperactive cardioinhibitory reflex was the only finding suggesting the diagnosis of coronary disease. The following case is an example.

CASE 3. A 60-year-old man, who was mildly diabetic, complained of occasional fleeting precordial pain, which occurred spontaneously and was not accentuated by exertion. At times, he also experienced some dizziness, cough and slight dyspnea. He applied for insurance disability, but his claim was rejected because the company cardiologist found his heart to be "perfectly normal."

Physical examination revealed the heart to be of normal size and shape, with a rate of about 84 per minute and a regular rhythm. The heart sounds were within normal limits of intensity, quality and duration. A faint systolic murmur at the apex was not transmitted. The aorta was moderately widened and tortuous, but the palpable arteries showed only a minimal amount of sclerosis. The blood pressure was 155–162/80–90. An electrocardiogram (Fig. 3) revealed nothing grossly abnormal, except for small Q waves in Lead 3, which in themselves were not significant, because the heart was transversely placed by a high diaphragm. Pressure on the right or left carotid-sinus regions resulted in stoppage of the heart for several seconds. This finding, together with the presence of some aortic changes and the diabetic state, definitely suggested the presence of coronary disease.

Seven weeks after examination, the patient suddenly developed a typical attack of acute coronary occlusion and died within 1 hour.

Relative Frequency of Hyperactive Cardioinhibitory Reflex and Electrocardiographic Abnormalities in Coronary Disease

To determine the relative frequency of occurrence of the cardioinhibitory carotid-sinus reflex and of abnormalities in the electrocardiogram in coronary disease, I analyzed a series of 1073 cases showing definite evidence of such disease. Eight

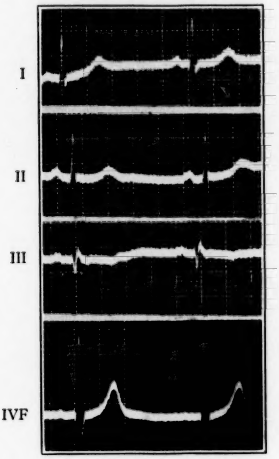

Figure 3.

This electrocardiogram shows normal tracings except for the presence of Q waves in Lead 3, due undoubtedly to transverse position of the heart caused by a high diaphragm, since its voltage varied with changes in respiration.

hundred and sixty-eight of these belonged to the group previously reported,[1] and 205 are new cases, observed since the last series was compiled. There were 784 males and 289 females in the entire group, and all grades of the disease were represented. The criteria used in the diagnosis were the same as those described previously.[1]

The degrees of cardioinhibition were divided into four groups as follows: +, when the slowing was less than 10 per cent; ++, when there was 10 to 30 per cent slowing; +++, when the slowing was 30 to 70 per cent; and ++++, when the heart stopped for at least three seconds. The electrocardiograms were divided into five groups, as follows: normal; left-axis deviation but otherwise normal; slight changes; moderate changes; and marked changes.

In the cases showing slight electrocardiographic abnormalities were included those with slight deviations in the QRST segment and some changes in the QRS complex, with or without left-axis deviation. The changes in the QRS complex consisted of slight slurring or notching, low voltage, excessively high voltage and the presence of a Q wave in Lead 3. In the group showing moderate abnormalities were placed cases with the following changes: considerable slurring or notching of the QRS complex, with or without prolonged intraventricular conduction time up to 0.12 second; abnormally low voltage of the QRS segment; moderate changes in the QRST segment, such as elevation or depression of more than 1.5 mm. with rounding; and a negative T wave in Lead 1 alone, a negative or diphasic T wave in Leads 2 and 3, or a negative T wave in Lead 4 alone. Many cases had more than one of these abnormalities and showed, in addition, left-axis deviation.

In the group showing marked abnormalities were placed cases with the following changes: bundle-branch block; extremely low voltage of the QRS segment, with marked notching; considerable depression or elevation of the QRST segment; and a negative T wave in all leads or at least in Leads 1, 2 and 4 or Leads 1, 2 and 3. Most of these cases also showed left-axis deviation or, occasionally, right-axis deviation.

Table 1 summarizes the incidence of the cardioinhibitory response and of the abnormalities in the electrocardiograms in the entire series of 1073 cases. It will be seen that, in the male group,

Table 1. *The Incidences of Cardioinhibitory Response and of Abnormal Electrocardiograms in 1073 Cases of Coronary Disease.*

Sex	No. of Cases	No. of Cases Showing Cardioinhibition	No. of Cases with Abnormal Electrocardiograms	
			Including Left-Axis Deviation	Excluding Left-Axis Deviation
Male	784	716 (91.3%)	619 (78.9%)	494 (63.0%)
Female	289	210 (72.6%)	257 (88.9%)	208 (71.9%)

91.3 per cent showed the cardioinhibitory reflex, whereas only 63 per cent showed abnormalities in the electrocardiogram, if cases having only left-axis deviation are excluded, or 78.9 per cent if such cases are included. Among females, about the same percentage of cases showed cardioinhibition as abnormal electrocardiograms.

A comparative analysis was also made of the various degrees of cardioinhibition and of the electrocardiographic changes. This is shown in Table 2 and Figures 4 and 5. It will be seen that

only 37.4 per cent of the male group showed significant (moderate and marked) electrocardiographic changes, whereas 61.8 per cent showed marked (+++ and ++++) cardioinhibitory reactions. In the female group, 40.0 per cent showed

nomenon, unassociated with other reflexes of the carotid-sinus group, such as a marked fall in blood pressure and cerebral manifestations, including dizziness, sensory disturbances and syncope, previously described by Weiss and his co-workers[5] and

TABLE 2. *The Relation of Cardioinhibitory Response to the Degree of Electrocardiographic Change in 1073 Cases of Coronary Disease.*

Types of Electrocardiograms	Sex	Degree of Cardioinhibition: 0 No. of Cases	0 Per-centage	+ No. of Cases	+ Per-centage	++ No. of Cases	++ Per-centage	+++ No. of Cases	+++ Per-centage	++++ No. of Cases	++++ Per-centage	Totals and Percentages	
Normal	Male	12	7.3	24	15.6	37	24.1	32	21.1	60	39.2	165	21.0
	Female	9	28.2	7	30.4	8	34.7	5	21.7	3	13.2	32	11.0
Left-axis deviation	Male	11	8.8	16	14.0	35	30.7	27	23.6	36	31.7	125	15.9
	Female	14	28.6	10	28.5	12	34.2	8	22.8	5	14.5	49	16.9
Slight changes	Male	20	10.0	25	13.8	41	22.5	51	28.0	65	35.7	202	25.7
	Female	31	33.4	20	32.2	20	32.2	12	19.3	10	16.3	93	32.1
Moderate changes	Male	15	7.7	27	14.8	41	22.5	45	24.7	69	38.0	197	25.1
	Female	17	26.6	9	19.3	13	27.6	13	27.6	12	25.5	64	22.1
Marked changes	Male	10	10.6	5	6.1	23	27.0	18	21.1	39	45.8	95	12.3
	Female	8	15.7	11	25.5	10	23.2	14	32.5	8	18.8	51	17.9
Totals and percentages	Male	68	8.7	97	13.5	177	24.7	173	24.1	269	37.7	784	100.0
	Female	79	27.4	57	27.1	63	30.0	52	24.7	38	18.2	289	100.0

gross electrocardiographic abnormalities, and 42.9 per cent marked cardioinhibition.

The table and charts also show that no relation exists between the degrees of cardioinhibition and electrocardiographic changes. The group with normal electrocardiograms showed approximately the same percentage of cases with the higher degrees of cardioinhibition as the groups with marked electrocardiographic changes.

Discussion

It appears from the findings presented here that a hyperactive cardioinhibitory carotid-sinus reflex occurs more frequently than abnormalities in the electrocardiogram in cases of coronary disease. This applies also to the higher degrees of hyperactivity, which are definitely abnormal manifestations and occur very infrequently in the absence of coronary disease. The test may therefore perhaps be considered to be of more diagnostic value than the electrocardiogram in the recognition of such disease.

Like any other test or method of examination, however, the hyperactive cardioinhibitory carotid-sinus reflex has its shortcomings and pitfalls. The facts that it does occur in cases other than coronary disease and that many cases of such disease show a negative response limit its usefulness in such diagnosis. This, however, applies also to the electrocardiogram and to all other means of diagnosis.

The test may perhaps be considered to be a definite sign in coronary disease under the following conditions: if it occurs as an independent phe-

by Smith[6]; if it occurs as the principal manifestation of the group of reflexes, the other signs, appearing either late or early, being dependent on this reflex for their production; and if it appears after comparatively slight pressure on the carotid-sinus region and no other vagal disturbances occur. Under such circumstances, one must assume that the selective augmentation of the induced vagal impulse is in the cardiac ganglions rather than in the ganglions of vagal centers in the medulla. If such augmentation occurred in the medullary centers, it would conceivably affect the entire vagal system rather than predominantly that of the heart.

In the present state of knowledge, only a theoretical explanation may be offered for the frequent occurrence of a hyperactive cardioinhibitory carotid-sinus reflex in coronary disease. As stated in the previous communication,[1] it is possible that local ischemia diminishes the resistance of the ganglions and of the myoneural junctions of the vagus nerves in the heart. Another explanation may be that the ischemic condition caused by coronary disease may produce local chemical changes that sensitize the vagal system in the heart. That there is some chemical relation between coronary disease and vagal activity is shown by the work of Loewi.[7] He brought forward experimental evidence to show that the vagus nerves produce a substance, which he[8] later considered to be identical with acetylcholine, that caused the same effect on the heart as vagal stimulation itself. The effect of the substance is neutralized by atropine. Hall, Ettinger and Banting[9] produced experimental coronary disease and myocardial damage in

animals by repeated injections of a 1:10,000 solution of acetylcholine daily over a period of months.

Whatever the explanation may be, I believe that the reflex has great practical value in the diagnosis of such disease among patients in the coronary age group who present suspicious subjective symptoms.

The cases covered by this investigation are predominantly ambulatory. In hospital material, the incidence and degree of electrocardiographic changes in coronary disease are much greater, because of the more advanced damage to the heart. The incidence of the hyperactive cardioinhibitory reflex, however, is likewise greater in such cases.

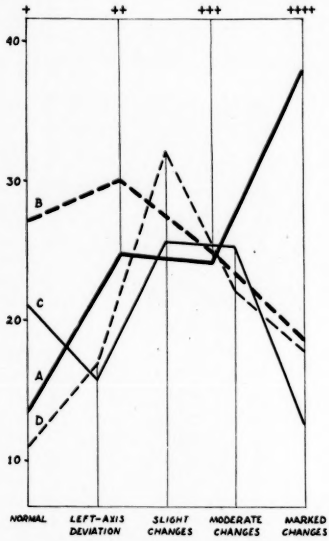

FIGURE 4. *The Incidence of Cardioinhibitory Response and of Abnormal Electrocardiograms in a Series of 1073 Cases of Coronary Disease.*

The ordinates represent the percentage of cases responding; the abscissas represent degrees of cardioinhibition and types of electrocardiographic changes.

Degrees of cardioinhibitory response are expressed in plus marks: + when the slowing was less than 10 per cent; ++ when there was 10 to 30 per cent slowing; +++ when the slowing was 30 to 70 per cent; and ++++ when the heart stopped for at least 3 seconds.

The designations for the types of electrocardiograms are described in the text.

A *represents the male cardioinhibitory responses, and* B *the female;* C *represents the male electrocardiographic findings, and* D *the female.*

SUMMARY

A comparative study is presented of the incidence of a hyperactive cardioinhibitory carotid-sinus reflex and of electrocardiographic abnormalities in a series of 1073 cases, mostly ambulatory, of coronary disease. It was found that 91.3 per cent of the males and 72.6 per cent of the females in this series showed the cardioinhibitory response, whereas only 63 per cent of the males and 71.9 per cent of the females showed abnormalities in the electrocardiogram. High degrees of cardioinhibitory response, which are definitely abnormal, occurred in 61.8 per cent of the males and 42.9 per cent of the females. Marked electrocardiographic abnormalities occurred in only 37.4 per cent of the males and in 40 per cent of the females.

It is believed that the hyperactive cardioinhibitory carotid-sinus reflex may be used as an aid in the diagnosis of coronary disease in persons of the coronary age who present suspicious complaints. As such, it is often of greater value than the electrocardiogram, and will suggest the correctness of the diagnosis when the electrocardiogram may be entirely misleading.

The explanation for the frequency of the hyperactive reflex in coronary disease is at the present state of knowledge purely theoretical. It may be due to local ischemia in the heart, which lowers the resistance in the vagal ganglions and in the myoneural junctions, or which produces some chemical changes that sensitize the vagus nerves locally.

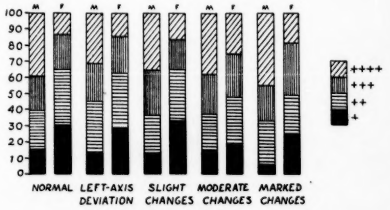

FIGURE 5. *Degrees of Cardioinhibition, Expressed in Percentage of Cases, in Each Type of Electrocardiogram.*

The descriptions of the degrees of cardioinhibition and the types of electrocardiograms are the same as those in Figure 4. M *represents males;* F, *females.*

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THE TREATMENT OF ANGINA PECTORIS WITH TESTOSTERONE PROPIONATE*

Preliminary Report

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DURING the last few years, a number of observations have been reported on the genital as well as the extragenital effects of testosterone propionate. There are, however, only a few papers dealing with its action on the circulatory system. Ratschow and Klostermann,[1] in experimental work on rats, observed that an androgenic preparation prevented the sloughing produced by the vasoconstricting effect of ergotamine. Clinically, Arndt[2] reported favorable results in 8 male patients treated with testosterone propionate; 5 of these had peripheral vascular disease, and 3 had angina pectoris. Edwards, Hamilton, Duntley and Hubert[5] have described an increase in the cutaneous vascular bed in castrate and eunuchoid patients treated with testosterone propionate.

The effect of testosterone propionate on blood pressure in patients with hypertension is debatable, the number of cases studied being too small to be conclusive. Steinach, Peczenik and Kun[4] observed a significant fall in systolic pressure in 31 of 49 patients with hypertension, following treatment with either androsterone benzoate or testosterone propionate. On the other hand, Greene[5] found no significant change in the blood-pressure levels in 21 patients who had been treated with testosterone propionate for senile enlargement of the prostate, the majority of whom had hypertension.

Edwards, Hamilton and Duntley[6] observed beneficial effects from testosterone propionate in peripheral vascular disease. Three patients with thromboangiitis obliterans (Buerger's disease) and 4 with peripheral arteriosclerosis showed early, definite skin vascularization.

In view of these observations, 24 patients with angina pectoris were given testosterone propionate in an attempt to ascertain whether this form of treatment would influence either the frequency or the severity of the attacks.

Methods and Results

Since June, 1939, 20 men and 4 women, varying in age from forty to seventy-seven years, have been treated with testosterone propionate for angina pectoris. In all these patients, the diagnosis of angina pectoris was clearly established, and was based on a history of typical attacks of substernal or precordial pain precipitated by exertion or emotion and quickly relieved by rest or by nitroglycerin. Each of the patients selected for this study experienced at least one anginal attack daily, and the majority had several. Most of the patients were treated during the fall and winter months, at a time when climatic conditions made them more subject to anginal attacks. These patients were given no medication except nitroglycerin to relieve an attack, were kept ambulatory and were encouraged to perform their usual duties.

Twenty-five milligrams of testosterone propionate dissolved in 1 cc. of sesame oil‡ was given intramuscularly every second to fifth day, depending on the frequency and severity of cardiac pain and the response to treatment, for a total of between five and twenty-five injections, with an average of eleven injections. No untoward reactions were noted. The dosage was chosen arbitrarily, and it is possible that smaller amounts of the drug may give equally good results.

All patients in this series improved under testosterone propionate treatment, but the improve-

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TABLE 1. *Results of Testosterone Propionate Treatment in Cases of Angina Pectoris.*

CASE NO.	AGE	SEX	DURATION OF ANGINA	LIMIT OF PHYSICAL ACTIVITY BEFORE TREATMENT	BLOOD PRESSURE BEFORE TREATMENT	BLOOD PRESSURE AFTER TREATMENT	NO. OF INJECTIONS BEFORE IMPROVEMENT	TOTAL NO. OF INJECTIONS	LIMIT OF PHYSICAL ACTIVITY AFTER TREATMENT	DURATION OF IMPROVEMENT WITHOUT FURTHER TREATMENT	REMARKS
	yr.		yr.							mo.	
1	52	F	3	Pain on climbing 1 flight of stairs or walking 2 blocks	150/90	110/75	3	14	No pain on climbing 1 flight of stairs or walking 9 blocks	5	Patient died of acute cardiac infarction 1 year after treatment was discontinued.
2	68	M	6	Pain on climbing 1 flight of stairs	155/85	125/80	2	5	No pain on climbing 3 flights of stairs	7	Improvement maintained to date
3	40	M	¼	Pain on climbing 1 flight of stairs or walking 6 blocks	120/80	110/80	2	5	No pain on climbing 3 flights of stairs or walking 1 mile	8	Improvement maintained to date
4	65	M	1	Pain on climbing 1 flight of stairs or walking 3 blocks	125/75	120/75	2	12	No pain on climbing 2 flights of stairs or walking 1 mile	6	Improvement maintained to date
5	54	M	(2 weeks)	Pain on climbing 1 flight of stairs	120/90	85/65	3	8	No pain on climbing 3 flights of stairs	12	Patient has returned to work as a steamfitter.
6	61	M	7/12	Pain on climbing 1 flight of stairs or walking 2 blocks	170/95	155/90	2	25	No pain on climbing 2 flights of stairs or walking ½ mile	3	Because of minor, intermittent anginal attacks, treatment continued for 6 months
7	66	M	2	Pain on climbing 1 flight of stairs or walking 2 blocks	140/80	100/60	2	14	No pain on climbing 3 flights of stairs or walking ½ mile	6	Patient died suddenly 6 months after treatment was discontinued.
8	64	M	½	Pain on climbing 1 flight of stairs or walking 50 yards; for 1 year, unable to work as electrician.	170/90	145/90	4	10	No pain on climbing 3 flights of stairs or walking 2 miles; back to work as electrician.	7	After recurrence of anginal attacks, second course of 10 injections, with freedom of attacks for 2 months; third course of 5 injections given, with improvement of 2 months' duration; improvement maintained to date.
9	62	M	3	Pain on climbing 3 to 4 stairs or walking 3 blocks	140/90	110/80	5	9	No pain on climbing 54 stairs or walking 1 mile	4½	Patient died of acute cardiac infarction 4½ months after treatment was discontinued, but was entirely free of anginal attacks in the interim.
10	50	M	3½	Pain on climbing 7 stairs or walking 2 blocks	120/80	105/70	2	5	No pain on climbing 2 flights of stairs or walking ½ mile	5	Patient reported that his feet had become warm for the first time in 3 years.
11	66	M	3	Pain on climbing 1 flight of stairs or walking 100 yards	165/80	135/80	4	20	No pain on climbing 3 flights of stairs or walking 1 mile	2	Treatment continued for 4 months because of occasional mild anginal pain; second course of 6 injections given because of recurrence of symptoms, with excellent results.
12	57	M	¼	Pain on climbing 1 flight of stairs or walking 3 blocks	150/80	118/88	1	6	No pain on climbing 2 flights of stairs or walking 12 blocks	10	
13	56	M	3	Pain on walking 2 blocks	170/40	120/40	3	13	No pain on walking 1 mile	3	Patient has syphilitic aortitis with aortic regurgitation.
14	52	M	½	Pain on walking 3 blocks	140/80	100/75	3	13	No pain on walking 2 miles	3	
15	49	M	½	Pain on climbing 1 flight of stairs or walking 4 blocks	240/130	180/100	2	7	No pain on climbing 2 flights of stairs or walking 1 mile	10	
16	66	M	1/6	Pain on climbing 1 flight of stairs or walking 1 block	150/90	120/80	3	6	No pain on climbing 1 flight of stairs or walking 10 blocks	8	
17	70	M	1/12	Pain on climbing 1 flight of stairs or walking 2 blocks	165/90	140/80	2	8	No pain on climbing 3 flights of stairs or walking 10 blocks	2	
18	55	M	1	Pain on walking 1 block; for 1 year, unable to work.	140/75	130/80	3	13	No pain on walking 1 mile; has returned to work as machinist.		Treatment just completed

TABLE 1 (*Concluded*).

CASE NO.	AGE	SEX	DURATION OF ANGINA	LIMIT OF PHYSICAL ACTIVITY BEFORE TREATMENT	BLOOD PRESSURE BEFORE TREATMENT	BLOOD PRESSURE AFTER TREATMENT	NO. OF INJECTIONS BEFORE IMPROVEMENT	TOTAL NO. OF INJECTIONS	LIMIT OF PHYSICAL ACTIVITY AFTER TREATMENT	DURATION OF IMPROVEMENT WITHOUT FURTHER TREATMENT	REMARKS
	yr.		*yr.*							*mo.*	
19	54	M	1	Pain on climbing 1 flight of stairs or walking 3 blocks	120/80	100/60	4	14	No pain on climbing 3 flights of stairs or walking 1 mile		Treatment just completed
20	69	F	8	Pain on climbing 10 stairs or walking 2 blocks	190/105	120/80	6	12	No pain on climbing 19 stairs or walking 6 blocks		Patient died of acute cardiac infarction 2½ months after treatment was begun; while under treatment, anginal attacks were less frequent and considerably less severe.
21	50	F	4	Pain on climbing 1 flight of stairs	145/90	120/80	3	9	No pain on climbing 3 flights of stairs		Still under treatment
22	77	M	8	Pain on climbing 3 stairs or walking 1 block	140/90	130/80	1	8	No pain on climbing 1 flight of stairs or walking ½ mile	2	Improvement maintained to date
23	62	F	1	Pain on climbing 6 stairs or walking 1 block	180/100	140/70	4	10	No pain on climbing 15 stairs or walking ½ mile		Still under treatment
24	56	M	7	Pain on climbing 1 flight of stairs	160/80	130/80	3	9	No pain on climbing 2 flights of stairs		Still under treatment

ment was much greater in the men than in the women. The latter group is as yet too small to permit proper evaluation of the significance of sex on the efficacy of this therapy.

Two patients showed definite improvement after one injection, 8 after two, 8 after three, 4 after four, 1 after five, and 1 after six. Improvement was determined by the subjective report of the patient concerning a decrease in the frequency and severity of the attacks while continuing his usual routine, and by the ability of the patient to increase his physical activity without precipitating an attack. The beneficial effect of this course of treatment has been observed for as long as twelve months after the discontinuation of therapy.

Five patients were given six consecutive injections of sterile sesame oil prior to receiving testosterone propionate, and 2 were similarly controlled after a recurrence of their anginal symptoms following their first course of the drug. None of the patients who had received sterile sesame oil alone showed any appreciable change in symptoms. This was in marked contrast to the general improvement noted in the patients treated with testosterone propionate. The contrast was particularly striking in the 2 patients who were first treated with testosterone propionate with remarkable improvement (Cases 8 and 11, Table 1), and then had a recurrence of symptoms four and seven months, respectively, after the last injection. For these new attacks, they were given placebo injections of sterile sesame oil, without clinical improvement. Following a return to testosterone propionate therapy, relief of anginal attacks was again obtained.

Of interest is the fact that in the majority of the patients there was a lowering of blood pressure during the course of testosterone propionate therapy, but it is questionable whether any significance can be attached to this.

Fluoroscopic examinations, serial kymograms and electrocardiograms showed no uniform changes resulting from this therapy.

DISCUSSION

Angina pectoris has been shown to be the result of myocardial ischemia, developing from a greater demand for coronary blood flow than can be supplied at the given instant.[7] This discrepancy between supply and demand is most frequently associated with a narrowing of the coronary arterial bed. It has further been indicated that, in cases of angina pectoris unassociated with either hypertension or valvular disease, there are occlusions of the major coronary arteries.[7, 8] Since the pathologic basis for angina pectoris is relative anoxia of the myocardium, therapy has been directed toward improving the coronary circulation. This can be accomplished either by vasodilatation of existing vessels or by promoting collateral circulation.

Vasodilating drugs, such as nitroglycerin and the xanthine derivatives, have enjoyed widespread use in the treatment of angina pectoris. These have been shown to increase coronary flow directly by vasodilatation of the coronary arteries.[9] This effect, however, is only transitory.

Improved myocardial blood supply is the major desideratum in the control of angina pectoris. This problem has been approached surgically with some success, but such methods have definite limitations

because of the operative risk.[10–12] The observations of Gross[13, 14] indicate that anastomotic channels between the right and left coronary arteries develop to an increasing degree with advancing age. From more recent studies on the coronary circulation, it has become apparent that the development of these anastomotic channels is dependent on partial or complete occlusion of one or more major coronary arteries.[15, 16] Furthermore, in post-mortem examinations, the adequacy of such collateral circulation in some cases has been proved by the lack of significant myocardial damage in the presence of obstructive arterial lesions of long duration.[7] Whether the improvement noted with testosterone propionate in the treatment of patients with angina pectoris, as well as the results obtained by Edwards, Hamilton and Duntley[6] in the peripheral circulation, can be ascribed to the development of collateral channels is a matter of speculation.

In contrast to that of nitroglycerin, the action of testosterone propionate is not instantaneous, and does not relieve an acute attack. Its action is only gradually discernible, the majority of the patients showing clinical improvement only after several injections. On the other hand, relief obtained was persistent, ranging from two to twelve months after treatment was discontinued.

Since the initiation of this investigation, Walker[17] has published data on patients with cardiovascular disease; 5 of these exhibited the syndrome of angina pectoris. Treatment with testosterone propionate led to definite improvement in 4 cases, whereas 1 patient was not benefited; however, the details of treatment in this latter case were not given. Increase in exercise tolerance, decrease in severity of pain and a general increase in strength were noted as manifestations of improvement. Recently, Bonnell, Pritchett and Rardin[18] also reported favorable results in 5 men with angina pectoris who were treated with an androgenic substance obtained from urine.

Summary

Twenty-four patients, 20 men and 4 women, varying in age from forty to seventy-seven years, in whom the diagnosis of angina pectoris was clearly established, were treated with testosterone propionate.

Twenty-five milligrams of the drug was administered intramuscularly every second to fifth day for a total of between five and twenty-five injections, with an average of eleven injections.

Favorable results were obtained in all cases in that the frequency, severity and duration of attacks of angina pectoris were diminished, and these patients have been able to increase their physical activities to a considerable degree without precipitating attacks. The beneficial effects of this treatment persisted between two and twelve months after treatment was discontinued.

The improvement in the men was much greater than in the women, although the latter group is too small to permit proper evaluation.

No appreciable improvement was noted following control injections of plain sesame oil, although the same patients responded when placed on testosterone propionate therapy.

No untoward effects were observed in any of the patients studied.

Fluoroscopic examinations, serial kymograms and electrocardiograms showed no uniform changes resulting from this therapy.

In view of the therapeutic response and the absence of untoward reactions, it is believed that testosterone propionate may prove to be a valuable drug in the treatment of angina pectoris and warrants further investigation.

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USE OF THE ASPIRATING NEEDLE IN THE DIAGNOSIS OF SOLITARY RENAL CYST*

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THE preoperative diagnosis of solitary cyst of the kidney can rarely be made with complete assurance. It is particularly difficult and very often impossible to distinguish between cyst and tumor, for the same symptoms and physical findings may be produced by each. Hematuria is commoner with tumor, although it also occurs with cyst, in some series as high as 25 per cent being reported. Roentgenography may be helpful, but is rarely conclusive, since any or all of the criteria for the x-ray diagnosis of cyst are equally applicable to tumor. These are, as defined by Braasch[1] and by Greenberg et al.[2]: a rounded bulge in the renal outline; alteration of the normal position or axis of the kidney; compression deformities of the pelvis and calyxes; deformity and compression of the ureter; pressure on adjacent organs; and calcification. Braasch has summarized the situation as follows: "In most cases uncomplicated renal cyst needs no treatment. However, the difficulty of clinical differentiation between simple cyst and neoplasm is the usual cause for surgical exploration, and in fact makes such exploration necessary in almost every case of renal cyst."

It is naturally of purely academic interest to attempt clinical distinction between the two conditions if one believes that all cysts should be operated on. A difference of opinion exists on this point, some urologists holding that, if a cyst produces no symptoms, there is no need for operation. Lately, the possibility of treating cysts by aspiration has once more been discussed. In 1939, Fish[3] presented 2 cases that, since operation was contraindicated, were successfully treated by aspiration and instillation of 50 per cent glucose as a sclerosing agent. The glucose was used when the cyst fluid reaccumulated after a single aspiration. More recently, a series of 15 cases was reported by Dean,[4] who used aspiration alone as the procedure of choice. There were no complications, and the fluid did not reaccumulate.

Aspiration as a routine form of treatment has been generally regarded as unsuitable because of the possible coexistence of tumor in the same kidney. The type of tumor to be chiefly feared appears to be not a separate and distinct growth, which would be no likelier to occur in conjunction with a cyst than in any kidney, but the rare form called "hypernephric cysts." These, according to Hepler,[5] are cysts with thick fibrous walls containing small islands of carcinoma. The cyst fluid may be clear. Hypernephric cysts are not common, but their occurrence[6] constitutes the strongest argument against the routine use of aspiration therapy.‡ It may be noted in passing that one common form of surgical treatment — namely, excision of the extrarenal portion of the cyst and carbolization of the remainder — may well be ineffective in this type if unrecognized. Aspiration may be employed to advantage, however, in the treatment of cases in which symptoms are distressing but operation is contraindicated.

It is in the field of differential diagnosis, I believe, that aspiration can be most valuable. The procedure is simple and, if carefully done, carries practically no risk. In fact, Dean[4] has performed aspiration biopsies on 150 solid renal tumors, without mishap. Since nothing is injected, the chief hazards of perirenal air insufflation are avoided. Even if operation is contemplated, the definite establishment of the diagnosis of cyst in a case in which a large mass is present may permit the operator to select the lumbar approach rather than the abdominal. Again, if one is dealing with an asymptomatic mass connected with the kidney, the finding of clear fluid on aspiration raises a distinct question of the need of operation, especially when any deterring factors exist. Before aspiration, it is, of course, essential to have satisfactory x-ray studies, including at times a barium enema, to determine definitely the anatomic relation of the colon to the cyst.

In the following cases of solitary cyst, in which the suspected diagnosis was confirmed by aspiration, neither patient was operated on. One, having been observed for sixteen months, affords some additional information concerning the rate of reaccumulation of fluid. Data on this point in the literature are inconclusive because so few cases have been followed. If, with the reporting of a

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‡Since presenting this paper, I have observed a case of hypernephric cyst. A patient with a mass attached to the kidney, diagnosed "solitary cyst" by x-ray study, and with clear fluid obtained on aspiration was subsequently explored because of persistent pain. The kidney was found to contain adenocarcinoma in the cyst wall and in the immediately adjacent renal tissue, and was removed.

significant number of observations, it appears that reaccumulation may take years, urologists will be more inclined than at present to employ aspiration as a therapeutic measure in selected cases.

Case Reports

Case 1. J. H. G., a 56-year-old man, entered the Worcester Memorial Hospital on December 30, 1939, complaining of painless hematuria occurring intermittently during the preceding 2 days. He had no other urinary symptoms and considered himself to be in good general health. The previous history was noncontributory, except that the patient had had an appendectomy in 1933 and a herniorrhaphy 4 years later. The urinary sediments reported during these hospital entries were normal.

The patient was moderately obese and of a plethoric type. Physical examination showed no costovertebral tenderness; neither kidney could be felt. The urine was grossly bloody, but other laboratory findings were within normal limits. Through the cystoscope, the blood was seen to be coming from the right ureteral orifice, and on ureteral catheterization, the urine from this side was bloody whereas that from the left was clear. Cultures from both kidneys were negative. A flat x-ray film showed the lower pole of the right kidney to be opposite the 3rd lumbar interspace. In the region of the upper pole, there was a large, rounded soft-tissue mass, with a sharp outline and of homogeneous density. Retrograde pyelograms showed the upper calyxes of the right kidney to be displaced downward. The left kidney pelvis appeared normal. From these findings, the roentgenologist made a diagnosis of probable solitary cyst.

Largely to confirm this diagnosis, aspiration was carried out a few days later. The patient was prepared as if for a right nephrectomy, and all plans were made to proceed with this in the event of a dry tap. Under light general anesthesia, a lumbar-puncture needle was inserted below the 12th rib on the right, just lateral to the spinal muscles in a direction inward, upward and slightly forward. A definite sensation of entering a cavity was not made out; when the desired depth was reached, however, the obturator was removed, and clear yellowish fluid obtained — 325 cc. being aspirated. On examination, the fluid showed the following characteristics: alkaline reaction, specific gravity 1.012, sugar 117 mg., total protein 2.4 gm. and chlorides 610 mg. per 100 cc. and a few red blood cells per high-power field in the sediment.

On the following day, the patient felt perfectly well and has been so ever since, except for a mild intermittent lumbar backache, starting on the right, and present chiefly when he is tired. This pain had never been present previously, its first occurrence being about 2 weeks following the aspiration. What connection, if any, there may be is not clear. It has become no worse in the past year. The patient had a single recurrent episode of hematuria 8 months later.

The size of the cyst has been followed at intervals. An intravenous pyelogram taken 2 days after aspiration showed neither downward displacement of the kidney nor pressure defect of the upper calyxes. Instead of the large shadow previously noted, a small nub of tissue could be seen projecting from the upper pole. A month later, there was an appreciable increase in the size of this mass, and 8 months later it appeared to be about a quarter to a third as large as originally, slight depression of the upper calyxes reappearing. In a recent flat x-ray film, however, 16 months after aspiration, the mass did not seem to have increased appreciably.

Comment. It is possible that operation must at some future time once more be considered in this case. However, if clearly related symptoms should recur, aspiration could again be done with hope of relief. The so-called "hypernephric cyst" cannot, of course, be entirely ruled out.

Case 2. Z. R., a 61-year-old woman, was referred to the Worcester Memorial Hospital on June 12, 1940, because of the incidental finding of an abdominal mass by her physician. She had sought relief from transient headaches and dizzy spells. The history otherwise was irrelevant. The patient had always been in good general health.

On physical examination, the only positive finding of note was a mass the size of an orange in the left upper abdomen. It was rounded, smooth, movable and nontender. The urinary sediment contained many white blood cells and cocci per high-power field. At cystoscopy, the bladder appeared characteristic of mild chronic cystitis. Specimens of urine were obtained from both kidneys, cultures subsequently showing *Staphylococcus aureus* from each. In retrograde pyelograms, the right kidney pelvis looked normal. The mass appeared attached to the lower pole of the left kidney and moved with it. The lower calyxes were pushed upward slightly. A subsequent barium enema showed that the descending colon was displaced forward by the mass. Again, the roentgenologist was reasonably sure of the diagnosis of cyst.

Since the patient had no symptoms referable to the left kidney, it was decided to ascertain, if possible without operation, whether the mass was a cyst. She was accordingly prepared as for left nephrectomy, and under general anesthesia a lumbar-puncture needle was introduced lateral to the spinal muscles in the direction indicated by the x-ray films. The mass was steadied, and counterpressure exerted with the left hand. The motion of the needle with respiration was helpful in indicating that the kidney had been reached. Fluid was encountered, and about 150 cc. aspirated. No more could be obtained on attempted adjustment of the needle in the same plane, although it was realized that more fluid was almost undoubtedly present. There were no aftereffects, and the patient was discharged a few days later. She has been seen at intervals since then, the last time a month ago, or 9 months after aspiration. The mass has been palpable at all times, and showed only slight diminution in size after withdrawal of fluid. The patient remains entirely asymptomatic.

Comment. Aspiration in this case was purely a diagnostic procedure. Inability to withdraw more fluid may have been due to collapse of the cyst wall against the tip of the needle, to dislodgment of the needle from the cavity, or to the fact that the cyst was multilocular. Again, the possibility that this was a "hypernephric cyst" cannot be ruled out.

Conclusion

Aspiration is a simple procedure of value in the differential diagnosis of solitary cyst and tumor of the kidney.

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Discussion

President Roger C. Graves: This is a very interesting paper on a subject concerning which there may well be some discussion. One must weigh all the evidence, as Dr. Wheeler has said, and consider the advisability of aspirating a lesion that may be malignant; one must also consider the possibility of the risk that may be involved in dissemination of tumorous cells along the path of the needle outside the cyst or tumor; and one must decide wherein lies the greater risk: in assuming the presence of a cyst and not operating, or in assuming the possibility of a tumor and preferring surgical exploration.

Dr. G. G. Smith (Boston): I remember only too vividly a woman who had what I was sure was a cyst. I asked her to come back in six months, and she did not show up for three years, by which time she had a clearly developed large tumor of the lower pole of the kidney; she died following operation. This was some years ago, but if I had heard about Dr. Wheeler's paper at that time, I might have succeeded in getting a good effect. I believe it is not always easy to differentiate tumor and cyst. A short while ago, I operated on a man who had what looked like a typical cyst: a very large, round tumor below the kidney. Braasch states that a cyst throws a denser shadow than a tumor, and this man had quite a heavy shadow; I thought it was a cyst, but the radiologist pointed out that several spots on the outline of the mediastinum were very significant of tumor, at least of a metastasis. I operated on the patient, as I should have anyway, because it was a large tumor, and it did turn out to be a very malignant tumor. I think, however, that Dr. Wheeler's experiences should be borne in mind.

A Physician: I should like to ask if Dr. Wheeler has used fluoroscopy in these cases and if that would aid in differentiation.

Dr. C. L. Deming (New Haven): I have often wondered why, instead of aspirating, one does not inject iodide or some such fluid, which would produce a definite cystogram and might be of distinct advantage in making a differential diagnosis. Has Dr. Wheeler thought of that possibility?

Dr. Wheeler (closing): I have not used fluoroscopy. I think it might help in differentiating tumor and cyst, but it would still leave a good deal of doubt in certain cases. The main point to be borne in mind, it seems to me, is the possibility of tumor, particularly the hypernephric cyst. I have never seen any in my limited experience. I should be interested to know how common they are. So far as the injection of cysts is concerned, that has been done, although I have never tried it. Fish injected air and watched the rate of reaccumulation of fluid in his 2 cases.

MEDICAL PROGRESS

ABDOMINAL SURGERY

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Anesthesia

So-called "continuous" novocain spinal anesthesia, as advocated by Lemmon,[1] is gaining favor. The technical difficulties are not great when careful attention to details is observed. The advantages are the greater safety of the anesthetic drug used, and the short duration of the action of novocain, which makes it possible to carry out operations of any length of time. If this method is supplemented by splanchnic block from within the abdomen, it comes near the ideal sought for safe anesthesia in operations on the stomach and duodenum. It is my opinion that this method will become well standardized and will supplant the more toxic but longer lasting agents now in use for extensive procedures.

Bronchoscopy, adequately to remove secretions from the bronchial tubes in some patients after operation, is so vital that all anesthetists should be trained in this technic. Routine removal of bronchial secretions, as advocated by Haight and Ransom,[2] can be carried out to great advantage on the wards by the resident staff.

Suture Material

It is asserted that cotton thread is a better material for ligatures and sutures than silk or catgut,[3, 4] and the use of cotton in a wide variety of conditions during the last six months at the Massachusetts General Hospital has substantiated these claims. Cotton is easier to handle than silk, since it is slightly rougher and the knot is more easily set; also, the unused portions do not stick to the glove as those of silk do. It is easily sterilized by boiling or autoclaving. If cotton is wound on rubber tubing, the shrinkage that occurs when it is boiled compresses the tubing slightly and does not weaken the fibers. In corresponding sizes, it is stronger than unwaxed silk. It is well tolerated in the tissues and is not extruded even in

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septic wounds. Farris's[5] conclusion, based on experiments at the University of Michigan, that cotton causes less reaction in the cornea of the rabbit than other suture materials seems clearly corroborated by clinical data. The sizes most useful are Nos. 30, 40 and 60. It should be used instead of silk for ligatures and interrupted sutures. So-called "quilting cotton" is superior to ordinary cotton thread.

War Wounds

New types of injury to the abdominal viscera have been reported.[6] The term "burst abdomen" is used. One gains the impression that internal injuries without penetration are commoner than in former wars; such injuries are probably caused more frequently by falling debris than by concussion. The majority of abdominal wounds, however, are from fragments of high-explosive shells and are penetrating. The same rules of treatment apply to these injuries as to those seen in civil life. Early intervention (within six hours) gives the best results. Careful débridement, suture of the ruptured hollow viscera and closure without drainage are advocated. Late wounds (over six hours) must usually be regarded as already infected. The use of the Miller–Abbott tube and of the sulfonamides has improved the results. Huge defects of the abdominal wall may be treated by vaseline-gauze packs, to be left in place until extruded by granulation tissue. Vaseline-impregnated canvas may be sutured to the healthy skin edges to cover a large opening in the abdominal wall. The intestines adjust themselves to this new covering and do not become adherent to it. Ogilvie[6] points out that three conditions present in war wounds are not commonly found in the planned abdominal wounds of civil surgery: the abdominal peritoneum is damaged, as well as incised; the number of adhesions is apt to be greatly increased; and the first operation will probably have been done by some other surgeon in another hospital than that in which permanent care is attempted.

In war wounds, the best time to operate is very early (within six hours) or very late (after six weeks). Foreign bodies should not be removed if they are small and not near a large vessel, or if they are not the cause of a urinary, fecal or biliary fistula. The transperitoneal approach should not be employed for the removal of foreign bodies if it can be avoided. Subdiaphragmatic and pelvic abscesses are the only ones needing surgical drainage. Other abscesses either make their way to the surface or are discharged into a hollow viscus. Drainage of abscesses should be delayed as long as possible. Fecal fistulas should be closed very late unless high in the small intestine. Intestinal obstruction is aways treated by a Miller–Abbott tube, and the surgical approaches are identical with those of civil surgery: early operation in small-bowel and late operation in large-bowel obstruction. Care must be exercised to make the anastomosis in a portion of healthy viable bowel. Proximal decompression should always be used in suture of the large bowel.

Gordon-Taylor[7] has described many bizarre abdominal injuries occurring during the bombings of London. The results illustrate the excellent organization and care of the wounded civilians during these raids. Eviscerations and other serious multiple intra-abdominal injuries were successfully treated.

Appendicitis

Numerous reports have appeared during the past year concerning this common but serious malady. By careful analyses of the results in any clinic, one can lower the morbidity and mortality. The insidious onset and the lack of predominant signs and symptoms account for the serious state in which many of these victims reach the hospital. Educational efforts have been helpful, but there is still much to be desired along these lines.

Faxon and Rogers[8] have dealt with the late cases of appendicitis at the Massachusetts General Hospital. These cases have been separated into two clinical groups: those in which the general peritonitis was unassociated with a mass, and those in which such a mass was present. The data in each group have been carefully studied and allow certain deductions and recommendations that should result in a lower mortality rate. If appendiceal peritonitis is present without a definite mass, operation appears to be most dangerous on the fourth and fifth days of the disease. The McBurney incision seems to be the most satisfactory type. If a mass is present, operation should be deferred, if possible, until after the seventh day, when incision and drainage are done as a primary procedure unless the appendix can easily be removed. If appendectomy is not performed, the patient must return within six weeks for an interval operation.

The routine use of Wangensteen suction in complicated acute appendicitis has long been in practice in the clinic at the Massachusetts General Hospital and many others. Ward,[9] who has recently emphasized this adjunct to successful treatment, reports a reduction in mortality from 5.8 to 3.0 per cent in the cases treated in the University of California Hospital. He points out that decompression by this simple procedure should be carried

but until normal peristalsis and voluntary passage of flatus take place.

Penberthy et al.[10] use the Miller–Abbott tube for this purpose and admit that in two thirds of their cases the tube remained in the stomach, whereas in the other third it was carried into the small intestine. By this method, they have greatly reduced the mortality in children.

Robertson,[11] of Toronto, has had an extraordinarily satisfactory experience with acute appendicitis in children. He attributes his excellent results to early operation provided that the appendix has not perforated. If perforation has occurred, however, operation is withheld until the patient is in good condition. The most important single factor in reducing the mortality in this group of cases is, he believes, the Miller–Abbott tube. He advises immediate use of the tube before obstruction develops.

Proper use of the sulfonamides in appendicitis with spreading infection is established. Without any doubt, this group of drugs is lowering the death rate from appendicitis. Sulfanilamide crystals — 4 to 8 gm. intra-abdominally and into the wound — give a high blood level within a short time. The less soluble and better tolerated sulfonamides, particularly sulfadiazine, can be used to maintain a satisfactory level for several days. Residual abscesses may occur, but are usually in the pelvis and can be drained at a later time. Drainage at the time of operation should be instituted only when a frank abscess cavity has been opened.

Woodruff and McDonald[12] found 146 cystic tumors of the appendix in 43,000 appendices removed at the Mayo Clinic between 1914 and 1938. Ten of these showed Grade I adenocarcinomas. The rare incidence of cancer in the appendix is interesting in that the ratio is 1:4300 cases.

Gall Bladder and Bile Ducts

Early versus delayed operation in acute cholecystitis has continued to be a source of debate among surgeons. In an attempt to settle the matter in our own minds, certain of us[13] at the Massachusetts General Hospital analyzed the data bearing on the subject in a ten-year period. To clarify the terminology used in this argument, we accepted for study only patients with pain, fever, leukocytosis, right-upper-quadrant mass or muscle spasm. The surgeon's note describing the gall bladder as acute and the pathologist's report of acute cholecystitis were not accepted without the foregoing criteria. Thus, we rejected the case records of about 100 patients who may have had acute inflammation of the gall bladder but who were not sufficiently ill to fall into the classification of the serious entity usually suggested by the term "acute cholecystitis." Four hundred and fifteen cases were accepted as fulfilling these requirements. Since gangrene of the gall bladder is necessary to produce rupture and the serious complications increasing the morbidity and mortality, we further analyzed the case records on this basis.

Most of the reports deal with the time interval between admission to the hospital and operation. We believed, as Gage[14] did, that a better understanding of the situation could be determined if the interval between onset of symptoms and operation were regarded as the basis for study. Some of us believed that operation could be done more safely after the acute process had subsided, whereas others, for example, Miller,[15] were of the opinion that early surgery was indicated. This furnished sufficient data to make comparisons of the two schools of thought from our own records. Many interesting facts came to light in this study.

Rarely does a patient under the age of forty-five die following cholecystectomy. Only 2 deaths in 139 cases in this group occurred, and both were due to pulmonary embolism, proved at autopsy.

Only 10 patients had gangrenous gall bladders before the fourth day of the disease, and all recovered; there were only 3 deaths among 108 patients operated on before the fifth day of the disease. Patients operated on after the fifth day of the disease were likelier to have gangrene and perforation, and such cases were associated with a higher morbidity and mortality.

Eighty-five per cent of the patients had been admitted to the hospital during the early period of their illness. Thus, the patient and the physician were not at fault for the delay. Emergency operations in the night, usually carried out under an incorrect diagnosis, resulted in a higher mortality than those done the next morning after proper hydration and so forth.

Free rupture into the peritoneal cavity occurred in only 3 patients, with a fatal outcome in each case.

Cholecystectomy was a safer procedure than cholecystostomy, regardless of the duration of symptoms or the age of the patient. Careful study of the records failed to reveal that removal of the gall bladder would not have reduced the deaths in the group who had simple drainage. In spite of this, we still believe that a drainage operation may, on occasion, be justifiable.

It was not possible, by temperature elevation, degree of leukocytosis or any other evidence, to predict which cases would develop gangrene. One must assume that any acute inflammation of the

gall bladder may develop into gangrene, since 29.4 per cent of these gall bladders were gangrenous at operation.

Our final conclusions are: that the patient with acute cholecystitis should be operated on as soon as the diagnosis is established, fluid balance is restored, and proper operative facilities are at hand; that rarely, if ever, should the operation be considered an emergency; and that the gall bladder should be removed, simple drainage being done only when the circumstances permit a minimum operative procedure.

Berk[16] divided a group of cases into those operated on within forty-eight hours of onset of symptoms and those operated on after this period. The mortality rate in those operated on early was only one fourth that of the late group.

I[17] have previously emphasized the safety factors in gall-bladder surgery. Browne[18] gives further support to the conclusion that careful consideration of the anomalies of the extrahepatic-duct region is essential. In a study of 280 patients at autopsy, he observed that 92.8 per cent had normal common hepatic arteries, with the right hepatic artery passing posterior to the portal vein. Actually, he found a normal left hepatic artery in 66.7 per cent and a normal right hepatic artery in 79.7 per cent of the subjects. In 44 cases, the right hepatic artery closely paralleled the cystic duct. The anomalies of the cystic artery are not so critical from the standpoint of serious damage to the patient during cholecystectomy, but it is interesting to note that one out of three of Browne's subjects had multiple cystic arteries.

The seriousness of an anomalous right hepatic artery, particularly one that crosses anterior to the common hepatic duct, is borne out by a case in which the surgeon left a clamp on a large vessel that proved at autopsy to be the right hepatic artery; the patient succumbed in a manner commonly spoken of as a "liver death." Sutton[19] has produced this syndrome in animals by ligating the right hepatic artery.

Sandrini[20] calls attention to the frequency of anomalies of the cystic duct; such anomalies, in my opinion, account for many of the catastrophes and have some bearing on the mortality rate in gall-bladder surgery. I am sure that "liver death" should be extremely rare and that injuries to the common duct and hepatic arteries will not occur if sufficient care is exercised during the operation.

Pearse[21] has devised and used a vitallium tube for the repair of the common hepatic duct. Clute[22] and McKittrick and I have been able to use this method satisfactorily. Although it is adaptable in a limited number of situations, it will prove helpful in some anastomoses.

Brackin and David[23] have devised an ingenious type of anastomosis between the biliary system and the gastrointestinal tract. This procedure is believed by the authors, from their experimental and clinical data, to reduce the hazard of stricture and ascending cholangitis following the usual anastomosis. Their technic depends on a necrotizing silk ligature through the undenuded common duct or gall bladder and the mucosa of the stomach or duodenum. This type of anastomosis may be safer from the standpoint of ascending infection, but has the disadvantage of a delay of three or four days in relieving any biliary obstruction that may exist.

Duodenal Ulcer

Peters[24] has given a helpful physiologic concept of the proper treatment of certain complications of duodenal and pyloric ulcer. Complete rest of the gastrointestinal tract eliminates vomiting and distention. Without intubation of the stomach and with nothing by mouth, the almost completely constricted pylorus or duodenum allows salivary and stomach secretions to pass. Fluids given under these conditions cause less stimulation and less retention in the stomach if they contain sufficient sodium chloride to make them isotonic with blood serum. This is of great practical value in the preoperative management of obstructing ulcer, and in the postoperative management of any abdominal procedure in preventing ileus and vomiting.

Bisgard and Nye[25] bring out some interesting physiologic data that are opposed to the generally practiced procedures. Gastrointestinal motility is stimulated by the application of ice to the abdominal wall and by the ingestion of hot drinks by mouth. Thus, the ice bag over an inflamed appendix may be harmful. Heat applied to the abdominal wall inhibits gastrointestinal motility, as iced water taken by mouth does. Ice applied externally increases free and total gastric acidity. The ingestion of iced water diminishes the secretion of acid in the stomach. It is further claimed that dipping the patient's hands in iced water produces a stimulation of gastric acidity comparable to that of histamine.

Perforated peptic ulcer has been reviewed by Griswold and Antoncic,[26] and 111 consecutive cases treated in Louisville, Kentucky, were studied; there were 20 deaths in the series. They stress the importance of culturing the free fluid in the abdomen. In 18 cases with positive cultures for streptococci, there were 8 fatalities from peritonitis.

The authors recommend removal of the fluid by suction, closure of the perforation, 5 to 10 gm. of sulfanilamide powder intra-abdominally and 3 to 5 gm. in the wound, silk closure of the wound without drainage and Wangensteen suction. If the culture reveals streptococcus, sulfanilamide therapy is continued.

Ulfelder[27] has reviewed the cases of perforated peptic ulcer for a fifteen-year period at the Massachusetts General Hospital. The results in the last five years have not been better than those in the first five-year period of the study. Most patients surviving operation more than twelve hours after the onset of symptoms were found to have already sealed their perforation. This fact favors the use of the conservative measures of Wangensteen suction and ochsnerization in late cases. The yearly mortality curve roughly parallels the pulmonary infection death rate for Massachusetts.

Williams and Hartzell[28] offer a suggestion that may prove of great value in the diagnosis of acute perforated ulcer. They state that roentgenograms taken in the left lateral decubitus position show pneumoperitoneum in 88.9 per cent of cases as opposed to 77.7 per cent in the upright position.

Although surgeons have tried a wide variety of operative procedures for the cure of duodenal ulcer, all these methods have been found ultimately unsatisfactory in cases now requiring surgery except a subtotal resection, which includes the entire antrum, as well as a large segment of the fundus. It seems incredible that such an extensive operation should be necessary to relieve a patient suffering from physiologic disease of the digestive tract. This type of attack has long been routine in dealing with hyperthyroidism, yet it is still difficult to consider such radical measures when one is dealing with ulcer. Until a more simple solution is discovered, however, a small percentage of ulcer patients will be, of necessity, subjected to an elimination of the acid-hormone cells of the antrum, as well as a generous share of the acid-bearing cells of the fundus. The complications of duodenal ulcer, such as perforation, massive hemorrhage, scar-tissue obstruction and persistent symptoms in spite of good treatment, continue to place about 20 per cent of all patients with duodenal ulcer in the hands of the surgeon.

More evidence is being accumulated to substantiate the safety and the excellent end results when a proper partial gastrectomy has been performed on the right patient under ideal conditions. Walters, Lewis and Lemon[29] have reviewed the results in 212 consecutive patients and admit a careful selection for this operation. The operative mortality was 1.9 per cent, and only 2.5 per cent of patients developed anastomotic ulcers; 83.5 per cent were well on an unrestricted regimen of activity and diet, and 14 per cent required some restriction of diet and activity. The selection of the patient, according to his ability to withstand radical operation, is a significant one in this group of cases. One may assume that the anastomotic ulcers and the small percentage of patients still under some restriction occurred in those cases in which the ideal operation could not be carried out. It is not quite clear but almost certain that the recurrent ulcers developed in patients who either had a small amount of the antrum left in situ or had insufficient fundus removed. One must be sure of a low mortality in these nonmalignant lesions, and a few uncured patients in this group are a sign of better judgment than a higher mortality rate. If one leaves the antrum in subtotal gastrectomy, as advocated by Finsterer,[30] the operation is safer, but one may have to pay for this immediate safety by recurrent ulcers and unrelieved patients.

I am in complete accord with McKittrick[31] that, if the operation is technically difficult owing to the extent of the inflammatory reaction about the ulcer, or because of the type of organisms cultured from the ulcer, or if the general condition of the patient is poor, a two-stage gastrectomy is justifiable. Certainly, by this method in properly selected cases, there will be a decrease in the morbidity and mortality, both almost invariably associated with difficulties arising from the duodenal stump. The first stage consists in a Finsterer exclusion procedure, and the second stage, six weeks later, in a simple removal of the antrum and pylorus. This period of rest makes the difficult part of the operation easy to do before the reactivation of remaining acid cells has produced an anastomotic ulcer. Doubtless, an occasional patient will develop this complication before the second stage is carried out, but even this is a small price to pay for the added safety of the procedure.

The complications arising from the duodenal stump are well borne out in the excellent paper by McClure and Fallis.[32] Three of the four deaths in their entire series were due to these difficulties. In our own clinic, we know that increased experience of the operator reduces these complications to a minimum, but it is evident that there are technical situations demanding a change of pattern at times. It seems fair to say that a careful survey of the bile ducts, in relation to the ulcer and its inflammatory extension before the decision is made regarding the type of operation planned, will safeguard the outcome more intelligently than any standardized routine procedure.

I have long been interested in denuding the remaining antral segment of its mucosa, as advocated by Bancroft,[33] in difficult cases of duodenal ulcer. At the Massachusetts General Hospital, this procedure has been performed in conjunction with subtotal gastrectomy for duodenal ulcer in 14 cases. Although we have had some difficulties with the thinned-out segment and a few patients have had complications arising from this source, all but one have recovered. In a recent follow-up study[34] of all partial gastrectomies for duodenal ulcer, we were somewhat relieved to find no recurrent or anastomotic ulcers in this small group of cases. Our evidence supports the theory that this procedure is adequate when properly done, but it is definitely a second or third choice with us at present.

The most satisfactory results in our hands have been in cases of duodenal ulcer that has nearly or completely healed by hospital treatment. This may require several weeks and should include, at the end, a week or two of ambulatory activity. Under these circumstances, resection can usually be carried to a point where sufficient normal duodenum can be obtained for an adequate closure. The convalescence is short, and the patient has the greatest chance of taking on his regular duties in life with freedom from discomfort.

Gastric Ulcer and Cancer

The difficulty in differential diagnosis between benign and malignant ulcers of the stomach has long been recognized. Sufficient emphasis has not been placed on this subject, and many gastric lesions are treated as ulcer until the opportunity for cure is lost. Eusterman[35] believes that the distinction between benign ulcer and carcinoma should be more carefully evaluated in each patient: the larger ulcers — over 2.5 cm. in diameter — may prove malignant, whereas the smaller ones are usually benign, particularly in the younger patient. He advises careful watching of the patient until complete healing takes place, and warns that achlorhydria means cancer. He further states that benign gastric ulcer responds well to medical treatment.

Holman and Sandusky[36] also call attention to the diagnostic error in gastric lesions. In their clinic, the error was 15 per cent when any one diagnostic procedure alone was used. They report a mortality rate of 6.3 per cent in partial gastrectomy for these lesions.

We[37] have analyzed the records of the gastric-ulcer cases at the Massachusetts General Hospital over a ten-year period. It was surprising to find the diagnostic error as high as 35 per cent. The clinician, the roentgenologist and the gastroscopist preoperatively, as well as the surgeon at the time of operation, were all frequently incorrect in their diagnoses. We studied the acidity on this group and found that patients with "ulcer-cancer" had just as high levels as those with benign ulcer. Acidity was frequently present in typical gastric carcinoma, but achlorhydria was almost pathognomonic of cancer. The age of the patient and the duration of symptoms were important. Patients developing symptoms after forty-five were five times as likely to have cancer as ulcer. Patients of this same age group who had had symptoms over five years were likelier to have ulcer than cancer. The results of partial gastrectomy for ulcer were excellent: only 2 patients in a group of 51 had recurrence of ulcer symptoms. Although the mortality rate for the hospital for radical operation was 6 per cent, we have done forty-two consecutive partial gastrectomies in this ulcer-cancer group, with a single death.

Patients with obvious cancer of the stomach and an operable lesion have a 20 per cent chance of a five-year cure,[38] whereas those resected with the diagnosis of ulcer, but proving to have cancer, have a 40 per cent chance. This seems to be the best argument for early radical surgery in the borderline group.

Colon

Gibbon and Hodge[39] have presented another strong appeal for preliminary decompression by cecostomy or colostomy followed by aseptic anastomosis after resection of large-bowel tumors. In a collected group of cases reported by several clinics, the mortality rate was 14 per cent. A comparable series operated on by the exteriorization or obstructive-resection method, commonly called the Mikulicz operation, gave a mortality rate of 27 per cent. Cattell[40] reports from the Lahey Clinic, where the exteriorization operation is routine, a mortality rate of 13 per cent. Thus, in the hands of experts, the two methods have a comparable risk. The morbidity is less in the primary-anastomosis group, and the operability is the same in the hands of experienced surgeons in this field. Either of these satisfactory methods gives better results than open anastomosis in the average case. The latter procedure should be used only after thorough cleansing of the involved bowel by preliminary proximal drainage.

Firor and Poth[41] report on the results of preliminary preparation of bowel lesions with sulfanilylguanidine. Although there is some evidence that

this drug diminishes the number of colonies of pathogenic organisms in the bowel, it is not thought to be of great value by Stone,[42] who has discontinued its use after an experience with 25 cases. The local use of sulfanilamide following large-bowel resection seems to be of value.

Toyidzé,[43] by animal experimentation, has shown that thrombosis of venous collaterals due to trauma, infection and postoperative hemorrhage accounts for some of the failures at the suture line in colon anastomosis. I am sure that removal of the fatty appendages preliminary to bowel suture is unwise, and that the anastomosis should be done with these intact and without disturbance of the blood supply to the segment coming through the fatty attachments. At the Massachusetts General Hospital, we have recently encountered an anomalous blood supply to the transverse colon. This has caused us to take into account such a possibility and to modify our usual procedure in midtransverse colonic lesions. If the disease requires removal of the midtransverse colon, the preliminary operation should be anastomosis between the ileum and descending colon, or a cecostomy. Exteriorization of this midsegment, with all the disadvantages of prolonged morbidity and secondary closure, would be justified. We are convinced that anastomosis between the ileum and distal transverse colon followed by extirpation of the entire right bowel at a later date should not be the operation of choice. This method is safe and preferable in all lesions up to the midtransverse colon.

Eggers[44] has reported a group of 82 patients with diverticulitis of the sigmoid whom he has personally observed: 44 per cent developed serious life-threatening conditions; 24 per cent had acute perforation with abscess formation or peritonitis with fatal outcome in exactly half of such complications. Five of the 82 cases had associated carcinoma. There were no deaths in a group of 23 patients operated on at a time of election; of 8 who had resection, 2 had associated cancer. The total mortality in the entire group was 20 per cent. Egger's analysis of the symptoms and signs of diverticulitis is of interest, particularly since it shows that approximately 20 per cent of such patients have bleeding.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 28021

PRESENTATION OF CASE

A fifty-four-year-old Irish teamster was admitted to the hospital because of hoarseness and difficulty in swallowing.

He was well until about seven weeks before entry, when he became aware of hoarseness, unassociated with other symptoms. This persisted and grew progressively worse. Two weeks before entry, he first noted difficulty in swallowing solid foods: pieces that he swallowed lodged at the level of the larynx, requiring manipulation of the trachea to make them pass. This dysphagia grew worse, although the patient had no trouble in swallowing liquids. His diet was therefore limited to fluids. At about the same time, there was onset of a tickling sensation in the throat, leading to repeated dry coughing. After a while, the cough became productive of yellow-brown sputum. During the last two weeks, dyspnea appeared, at first only on exertion, but later at rest as well. In the two nights preceding entry, the patient was kept awake by dyspnea and orthopnea. He noted that the "choking" spells occurred especially when he lay on his right side. During the night before entry, he coughed up bright-red blood three times, to a total amount of about five tablespoonfuls. There was a loss of considerable weight during his illness, although the appetite remained good.

The past and family histories were irrelevant.

On admission, the patient appeared about ten years older than his actual age; he was well developed and nourished, despite recent weight loss. He was florid faced, with poor visual acuity and sclerotic fundi. The teeth were carious. The trachea was deviated markedly to the right. The chest was barrel shaped. Respirations were slightly labored, with "leopard-growl" sounds and rhonchi transmitted throughout both lungs. The heart was within normal limits of size, with somewhat distant sounds. The abdomen was soft, with the liver palpable on deep inspiration. The prostate gland felt enlarged, but smooth and of average consistence.

The temperature was 100°F., the pulse 80, and the respirations 25. The blood pressure was 170 systolic, 100 diastolic.

Examination of the blood showed a red-cell count of 3,460,000 with 8.5 gm. hemoglobin, and a white-cell count of 9000 with 72 per cent polymorphonuclears. The blood Hinton reaction was negative. The serum protein was 6.5 gm. per 100 cc., the chlorides 97.4 milliequiv. per liter, and the vitamin C level 0.1 mg. per 100 cc. The urine was normal.

Roentgenograms of the chest showed incomplete collapse of the right lower lobe, with apparently dilated bronchi included in the lobe. The middle lobe was likewise decreased in size. The mediastinum was displaced slightly to the right, and showed marked inspiratory shift toward the right. A soft-tissue mass 5 cm. in diameter occupied the left upper mediastinum and seemed to involve the wall of the esophagus. Just below the crossing of the aorta, there was another defect on the left anterior wall of the esophagus, with no definitely visible soft-tissue mass. There was slight delay in the flow of barium in the region of the upper mediastinal mass, but no delay was observed in the region of the lower esophageal defect. The patient had difficulty in emptying the barium from his pharynx, and at times a small amount of barium was seen in the trachea.

The temperature fluctuated irregularly from 100 to 103°F. The patient was given glucose clyses and various vitamins. On the seventh hospital day, a bronchoscopy was performed. The left vocal cord moved partially on phonation, but was well abducted. The right vocal cord was partially paralyzed in the midline. Airway through the larynx was satisfactory. Just below the glottis, a mass of apparent tumor tissue was found arising from the left lateral and posterior walls of the trachea and occluding about two thirds to three fourths of the lumen. The bronchoscope was then passed distal to the tracheal growth, and the right bronchial tree hastily examined. It appeared only slightly narrowed in the region of the right middle and lower lobes, and no outcropping could be seen. Since it was obvious that tracheal obstruction might occur following removal of the bronchoscope, a tracheotomy was performed with the bronchoscope in place. A tracheotomy cannula was then introduced, under novocain anesthesia, as low in the midline as possible. The patient returned to the ward in good condition.

The following morning, he was fairly comfortable; during the afternoon, however, he developed increasing respiratory distress and, in spite of frequent suction performed by a special nurse, died early that evening.

Differential Diagnosis

Dr. Lowrey F. Davenport: May we see the x-ray films?

Dr. Richard Schatzki: This triangular shadow in the right cardiophrenic angle was interpreted as a lower lobe that had markedly decreased in size or was collapsed. A film with more exposure shows what appear to be dilated bronchi in this area. The septum between the upper and middle lobe is lower than normal, and in the lateral view one sees the middle lobe also somewhat decreased in size. A lesion producing the obstruction to the bronchi of the lower and middle lobes is not visible. There is, however, this mass in the mediastinum, which displaces the trachea to the right side. During fluoroscopy, the esophageal lesions described in the record were by no means so obvious as they sound in the finished report. This patient apparently had only slight difficulty in swallowing the barium. He complained of some obstruction in the region of the upper esophageal lesion in the area of the soft-tissue mass, where the trachea was pushed over to the right side and forward. The trachea is very poorly visible in this region, a fact that is adequately explained by the bronchoscopic findings. The lower esophageal lesion just below the bifurcation was even less conspicuous. There was not the slightest impairment of the passage of barium by this lesion, which could be demonstrated only when the film was taken at the moment when the barium passed by the lesion. To sum up, there were three lesions present: two involving the esophagus, and one involving the right lower and middle lobes.

Dr. Davenport: We are given definite information that the man had a tumor in his trachea, and we gain the additional evidence from the x-ray films that he had a tumor in his esophageal wall, and also evidence of obstruction to the bronchus of the right lower lobe; I think the only questions that need concern us are the nature of the tumor and where it arose. On a percentage basis, both cancer of the lung and cancer of the esophagus appear much more frequently in men than in women — the ratios are put as high as 10:1. Consequently, we get no particular lead there. The onset of the inspiratory symptoms and the onset of dysphagia were almost simultaneous. It is not unusual in extensive cancer of the esophagus for dysphagia to be a late manifestation, and we have seen cases with involvement of almost the entire length of the esophagus without any complaint of difficulty in swallowing until the terminal stage. We have the report from the bronchoscopy that no tumor was visible in the lower bronchial tree. The tumor was high in the trachea, an unusual location for a primary cancer. Both benign and malignant tumors of the trachea are very rare, and I think from the information that we are safe in assuming that the growth was primary in the esophagus and that all the respiratory difficulties were the result of secondary involvement of the trachea, which is not an uncommon complication of the late stages of cancer of the esophagus.

The symptoms of the last few days, such as the acute dyspnea on change of position, suggest that there was actually a communication — a direct fistula — between the esophagus and trachea, with intermittent leakage of material from the esophagus into the trachea at times. Paralysis of the vocal cords too, on a percentage basis, is not an uncommon late complication of esophageal cancer. The bronchial narrowing in the right lower lobe might have been due to pressure from metastases or from the lower portion of the esophageal tumor.

We certainly do not have to consider benign growths or tumor arising from any other structure in that region. I should exclude a primary growth in the thyroid gland or any other structure.

My diagnosis is primary cancer of the esophagus, with all the subsequent manifestations due to involvement by both direct extension and pressure.

Dr. Tracy B. Mallory: Do you want to give your interpretation of the x-ray examination, Dr. Schatzki?

Dr. Schatzki: I had the same difficulty that Dr. Davenport had in explaining how to connect these three lesions. I was impressed by the fact that this patient's first symptom was not difficulty in swallowing. I think it is extremely rare for a patient with cancer of the esophagus to report to a physician with any other complaint than difficulty in swallowing. Having seen several cases of cancer of the bronchus involving the esophagus secondarily and none of cancer of the lower esophagus involving the trachea secondarily, although having seen quite a few with lesions higher up that involved the trachea, I thought it was a little more likely that the primary lesion was in the bronchus and that the masses in the mediastinum were metastases; I knew that this was not much better than a guess, but I definitely believed that I had to connect all these three lesions in some way.

Dr. Edward F. Bland: Does the small amount of barium in the trachea mean obstruction in the esophagus?

Dr. Schatzki: My impression was that it spilled over into the larynx because the patient had partial paralysis of the pharynx.

DR. BLAND: You did not think it evidence of a fistula at that time?

DR. SCHATZKI: No.

DR. ALLEN G. BRAILEY: How does Dr. Davenport explain the collapsed lower lung?

DR. DAVENPORT: By pressure.

DR. BRAILEY: From where? The main mass of the tumor was higher up.

DR. DAVENPORT: The patient had extensive neoplastic disease throughout the mediastinum. The whole question was where it arose. Was it primary in the respiratory tract or in the gastrointestinal tract?

DR. MALLORY: Certainly, one of the unusual features of this case is the nearly simultaneous appearance of difficulty in swallowing and difficulty in breathing.

DR. EDWARD B. BENEDICT: I saw the patient and was more impressed with the difficulty in swallowing than with hoarseness, and I should have esophagoscoped him rather than bronchoscoped him except that I was afraid of causing complete tracheal obstruction by pressure of the esophagoscope. Accordingly, I bronchoscoped him.

CLINICAL DIAGNOSES

Bronchiogenic carcinoma, with metastases to trachea and esophagus.

Bronchopneumonia.

DR. DAVENPORT'S DIAGNOSIS

Carcinoma of the esophagus, with secondary tracheal extension.

ANATOMICAL DIAGNOSES

Carcinoma of the esophagus, with metastasis to a mediastinal lymph node resulting in extension into the trachea and esophagus and an esophagotracheal fistula.

Bronchiectasis, chronic: right middle and lower lobes.

Acute tracheobronchitis.

Endocarditis, chronic rheumatic: aortic and mitral valves.

PATHOLOGICAL DISCUSSION

DR. MALLORY: Post-mortem examination showed a tumor mass, the major part of which lay between the trachea and esophagus and had spread into each of these structures secondarily. A fistulous tract connecting the esophagus and trachea had developed through the tumor. It was quite clear, however, that the tumor was not primary in either of these tubular structures at that point, whereas the second point of obstruction lower down in the esophagus, which Dr. Schatzki demonstrated, did present the characteristic picture of primary cancer of the esophagus. A metastasis in a lymph node high in the mediastinum had extended both anteriorly and posteriorly, producing essentially all the symptoms. I doubt if the primary tumor caused any of them. The right middle and lower lobes showed very extensive and old bronchiectasis, with fibrous pneumonitis. The bronchi showed no points of narrowing, and despite the lack of any history of bronchiectasis, the lesion obviously antedated the carcinoma by many years. It is not surprising that the coincidence misled Dr. Schatzki. There was also rheumatic heart disease.

CASE 28022

PRESENTATION OF CASE

A sixty-two-year-old housewife was admitted to the hospital because of severe dyspnea.

She was in good health for many years, except for extreme obesity. About one week before entry, she began to complain of shortness of breath accompanied by cough, but no other symptoms. Four and a half hours before entry, there was sudden appearance of substernal pain, following the emotional shock of hearing war news. This pain persisted, and was soon followed by severe, increasing dyspnea and by a cough that was productive of white sputum.

The past history was irrelevant, except for a suspicion that the patient had had "high blood pressure" for some time. The family history was noncontributory.

Physical examination showed an obese, moribund woman weighing about 350 pounds whose skin was pallid, slightly cyanotic and moist from perspiration. She was comatose, and the heart sounds could not be heard. The respirations were irregular, 8 to 10 per minute, with coarse bubbling rales. The temperature was not recorded. The pulse and blood pressure could not be obtained. There was no peripheral edema.

Oxygen was administered by a Boothby mask, tourniquets were applied, and intracardiac Coramine and adrenalin were given, without effect. Death occurred fifteen minutes after entry.

DIFFERENTIAL DIAGNOSIS

DR. JOHN TALBOTT: The story is brief, and the clinical picture appears to be uncomplicated. The patient had no complaints until a week before death. She was obese, and was said to have had hypertension, but neither of these suggest an impending rapid exitus. One week before death, the patient had some dyspnea and a cough productive of white sputum. Presumably these were not incapacitating, and no mention is made of her seek-

ing medical advice. Five hours before death, the patient was stricken with substernal pain and severe dyspnea. She was brought to the hospital moribund. The heart sounds were inaudible, the pulse and blood pressure could not be obtained, and the lungs contained moist rales. These were all the data available, and from them we must explain the sudden death.

Massive pulmonary infarction is a possibility. If this were the correct explanation, there should be something to suggest a focus for emboli. A deep infection of the veins of the abdomen and legs is the commonest cause of pulmonary emboli. I have excluded a phlebitis because there are no grounds for suspecting it. Furthermore, the patient did not have chronic valvular heart disease and no mention is made of auricular fibrillation. It is possible that the dyspnea present during the week preceding death might have been caused by small pulmonary emboli. I have excluded pulmonary embolism, finally, because of the statement that the cyanosis was mild. A patient dying from massive pulmonary embolism is apt to be deeply cyanotic.

A dissecting aneurysm might produce a sudden death such as this, but I am disinclined to consider it seriously. There is no history of back or leg pain — merely the hypertension and sudden death.

An acute episode of myocardial anoxia seems most probable. The absence of symptoms of angina in the past does not argue against this diagnosis. It is appreciated that the first symptom of coronary occlusion may appear only a few hours before death. It is granted that coronary occlusion is less common in women than it is in men; however, the obesity and hypertension seem to counterbalance her sex. The story of dyspnea during the week before death is consistent with coronary insufficiency. In acute insufficiency, vasomotor shock is profound. This was evident from the pallid skin, slight cyanosis, sweating and failure to detect any pulse or blood pressure. Of course, the failure to hear heart sounds might have been related to the abundance of subcutaneous fat, but it was more likely because of their weak character.

The lack of laboratory data allows us to speculate what such data might have shown. No mention is made of venous distention, so that the venous pressure was presumably not elevated, as it might have been in pulmonary embolism. An electrocardiogram would have been of interest in providing information regarding a previous coronary occlusion or in detecting a cardiac arrhythmia terminally. It would have been less informative concerning the terminal episode. A urine sample was not obtained, but we have no evidence to suggest a vascular nephritis. An x-ray film of the chest would have helped to determine the size of the heart and the presence or absence of a primary pulmonary process.

With the meager evidence available, I shall rest my argument on the most probable diagnosis: coronary insufficiency. It is possible that anatomic changes in the myocardial muscle accounted for the dyspnea before the terminal event.

Clinical Diagnoses

Coronary thrombosis.
Pulmonary edema.

Dr. Talbott's Diagnoses

Coronary sclerosis and coronary occlusion.
Old myocardial infarction.

Anatomical Diagnoses

Pulmonary embolism and thrombosis.
Obesity, extreme.
Hypertrophy of the heart.
Carcinoma of the tail of the pancreas.
Cholecystitis, chronic.
Cholelithiasis.
Cortical adenoma of the adrenal gland.
Pheochromocytoma of the adrenal gland.
Congenital anomaly: bifid ureter and double renal pelvis, left.
Adenoma of kidney.
Endometrial polyp.
Endocervical polyp.
Leiomyoma uteri.
Miliary tuberculosis, healed, of spleen and liver.

Pathological Discussion

Dr. Tracy B. Mallory: Dr. Talbott wisely stuck to the only point that could profitably be discussed in regard to this patient: the cause of her sudden death. He quickly narrowed the question down to two possibilities: pulmonary embolism and coronary disease. He placed his bet, as the clinicians on the wards did, on coronary thrombosis. We found, however, essentially normal coronary arteries and multiple pulmonary emboli. The main pulmonary trunk was empty as far as the point of bifurcation, but both the right and left pulmonary arteries were almost completely filled with fresh thrombi, which could be traced along all their branches down to the smallest grossly recognizable vessels of each lung. Imbedded in the matrix of these fresh thrombi were numerous darker brownish-red, twisted and coiled fragments of emboli, ranging from 3 to 6 mm. in

diameter. It seems quite clear that there had been multiple small emboli and then secondary thrombosis, which had virtually completely blocked the entire pulmonary arterial tree. We did not search for the source of the emboli, because a dissection of the vascular tree of the massive nether extremities threatened to produce insuperable difficulties for the embalmer.

The heart was large, weighing 500 gm., but there were extensive subendocardial fat deposits that must have weighed 75 gm. Discounting this, the heart was probably not greatly disproportionate to the size of the body. A few patches of atheroma were found in the coronary branches, but nowhere was there significant narrowing of the lumens.

Entirely aside from these factors, which were responsible for her death, the patient proved to be a museum of pathological curiosities. One always suspects endocrinopathy when dealing with extreme obesity. The pituitary and thyroid glands were both normal. The parathyroid glands were unusually large, but this proved to be due merely to exceptional amounts of interstitial adipose tissue, and the actual parathyroid tissue was, if anything, atrophic. One adrenal gland showed a cortical adenoma nearly 2 cm. in diameter, and the other showed a small but distinct pheochromocytoma of the medulla. There were a cortical adenoma of the kidney, endometrial and cervical polyps and multiple fibroids. The adenoma of the adrenal gland was not large enough to suggest a Cushing's syndrome, and there was nothing else to substantiate it, such as masculinization, vascular nephritis or increase in the basophilic cells of the pituitary gland. On the law of averages, one might have guessed that a woman of her configuration would have had gallstones. We found many of them enclosed in an enlarged gall bladder with thickened walls. A final total surprise was an early carcinoma of the tail of the pancreas, about 2 cm. in diameter. This was clearly of the acinar type, and consequently cannot be considered to have been a factor in her death. Two final items for the catalogue were the presence of many inactive fibrotic, almost healed, but recognizable miliary tubercles in the liver and spleen, and a congenital anomaly of the urinary tract.

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SERVICES FOR THE CARE OF CIVILIAN CASUALTIES

Massachusetts was one of the first states to set up adequate plans for the protection and medical care of the civilian population in the event of military attack, and a handbook, *Organization Medical Division and Care of Injured Civilians*, was published by the Medical Division of the Massachusetts Committee on Public Safety in September, 1941. Since then, many changes in organization have necessitated a second and revised edition that appears, in full, in this issue of the *Journal*, under the title, "Organization of Emergency Services for the Care of Civilian Casualties." The present recommendations bear the approval, in principle, of the defense councils of the five other New England states and of the American National Red Cross. The text will be issued as a handbook, which may be obtained by application to the Massachusetts Committee on Public Safety; furthermore, additions revised to conform with conditions in some of the other New England states will be made available by their respective defense councils.

The essential points of the plan call for a central state committee with regional medical heads, who assist in the formation of local organizations. Each community has a medical committee, comprising representatives of the professions and agencies concerned with all phases of medical care. Furthermore, each community has a chief medical officer, who is responsible for *all* aspects of emergency medical care, including the organization and equipment of first-aid parties and medical first-aid posts and the establishment of ambulance services, of a medical depot or depots, of casualty stations and of hospital services. In times of emergency, the chief medical officer proceeds to the report center and orders the mobile medical units — first-aid parties, medical first-aid posts and ambulances — to the medical depot, and if an incident occurs, he sends these units to the site of disaster. He is also responsible for the direction of the walking wounded to medical first-aid posts or casualty stations and for the transportation by ambulance of the more seriously wounded to the hospitals organized for emergency care. Subsequent transfer of the casualties to base hospitals is a responsibility of the regional medical head, and the evacuation of those who reside in particularly dangerous areas or who are especially vulnerable to disaster — women, children, the infirm and handicapped and the aged — is carried out under the supervision of the Evacuation Division. It is emphasized that the general scheme is not rigid and that the program suitable for a rural community is necessarily different from that in a metropolitan area.

All hospitals are organizing their staffs in such a way that twenty-four-hour emergency service can be provided. In the large urban hospitals, operating teams whose members are well trained in the care of certain types of injury — for ex-

ample, burns, fractures, shock, chest injuries, facillo-maxillary injuries and so forth — are being formed. In no instance, however, has a member of the permanent hospital staff been assigned to a medical first-aid post, for in times of emergency, all staff members will be needed at the hospital.

The many local chapters of the American Red Cross are taking an extremely active part in the program. They are supplying the surgical dressings in the first-aid kit belts of the first-aid parties; they will provide and administer mobile canteens and will furnish many of the ambulances, all of which are under the direction of the chief medical officer; and they will also arrange for the temporary housing, clothing and feeding of uninjured refugees.

All in all, Massachusetts and the other New England states should be proud of the initiative and the accomplishments of the state defense councils, of the medical, dental and nursing professions and of relief agencies in providing a comprehensive and unified scheme for the care of civilian casualties.

THE HUNTINGTON HOSPITAL

THE Collis P. Huntington Memorial Hospital, founded in 1912 as the hospital of the Harvard Cancer Commission, closed December 31. Fortunately, its patients will be cared for at the new Huntington Clinic at the Massachusetts General Hospital. Furthermore, the medical research laboratories, under the direction of Dr. Joseph C. Aub, have been given a generous amount of space at the Massachusetts General Hospital, and as soon as details can be arranged, the attack on the problems of growth, normal and abnormal, will be continued. The State Tumor Diagnosis Service, long maintained at the Huntington Hospital, will continue work in its present laboratories, without interruption.

As an indication of the advance that New England has made in the fight against cancer, the closing of the Huntington Hospital will mean the loss of less than 8 per cent of the beds for cancer patients, whereas fifteen years ago it would have meant the elimination of all such beds, other than a few for terminal care. Although the Massachusetts General Hospital will provide some additional beds for cancer cases, this does not mean that the situation can be regarded complacently and that special effort must not be made to compensate for the phases of work carried on at the Huntington Hospital that have been discontinued or will be cut down.

The Huntington Hospital was the scientific parent of the Pondville Hospital at Norfolk, the cancer unit of the Westfield State Sanatorium, the Palmer Memorial Hospital — the cancer unit of the New England Deaconess Hospital — and the state-wide tumor clinics, of which Massachusetts can justly be proud. Furthermore, many of the men specially skilled in cancer therapy received their training there. Those who served as student house officers, residents and members of the staff have made good use of the knowledge gained in the wards and clinics, returning to the community many times the value of the resources given to the hospital.

Under the leadership of the late Dr. Robert B. Greenough, the hospital reached its peak of influence. His views, largely based on experience gained there, shaped to a considerable degree the course that programs aimed at the control and treatment of cancer have since followed. But the day of the small special hospital has passed. Too costly in these times to operate for the number of patients it can serve, and its place in large part taken by special provisions in the large general hospitals, it can live only if heavily endowed.

In the management of the Huntington Hospital, another factor entered. It was operated by Harvard University, an educational institution, not a hospital corporation concerned with supporting itself by income from patients. Faced with continuing deficits at the hospital and with a problem not properly within its field, the university has wisely decided to transfer the care of patients to the Massachusetts General Hospital.

The research activities of the Harvard Cancer Commission will continue. The discoveries of the past — such as the fundamental observation by

Tyzzer of the inheritance of tumor susceptibility in animals, the development of the radium-emanation plant and the use of radon by Duane, the advances in knowledge of the relations of hormones to normal and abnormal growth and the isolation of growth inhibitors by Aub and his associates and the demonstration of individual human susceptibility to cancer by Warren's studies — augur well for progress in the future.

It is heartening to know not only that the research activities under Dr. Aub will be continued but that the clinical work, done so soundly and for so many years by Dr. Channing C. Simmons and the staff, will be carried on at the Massachusetts General Hospital, even though the hospital and its clinical staff have been discontinued. Hospitals, like human beings, die, but their good is not "interred with their bones."

MEDICAL EPONYM

Lugol's Solution

This was described by J. G. A. Lugol (1786–1851), physician at the Hospital Saint Louis, in "Mémoire sur l'emploi de l'iode dans les maladies scrofuleuses [A Note on the Use of Iodine in Scrofulous Diseases]," which was read before the Royal Academy of Sciences at the session of June 22, 1829, and published at Paris by J. B. Baillière in the same year. The following is a translation of sentences on pages 48 and 49:

> The method of preparation that I regard as most reliable is that of complete solution in distilled water . . . the amount of which vehicle I have established as one pound. I then dissolve one half a grain, two thirds of a grain or one grain of iodine, to have three concentrations of this remedy at my disposal. . . . Furthermore, I have sought to make this solution digestible by adding twelve grains of sodium chloride. . . . I have termed the three concentrations of this solution, *iodized mineral water* No. 1, No. 2 and No. 3.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

COMMITTEE ON MATERNAL WELFARE

Analysis of Causes of Maternal Death in Massachusetts During 1940

During 1940, in Massachusetts, 219 maternal deaths were reviewed by the Section of Obstetrics and Gynecology. The various causes of death are shown in Table 1; 2 deaths of nonpuerperal origin are included. It is very gratifying that there was a further decrease in the maternal-mortality rate: in 1939, it was 3.4 per 1000 living births, and in 1940, it was 2.8. The most striking reduction was in the deaths from sepsis: in 1939, of 253 maternal deaths investigated, 74 were due to sepsis, but in 1940, only 48 were from that cause. It is very likely that chemotherapy was responsible for this improvement.

Table 1. *Causes of Maternal Death.*

Cause	No. of Deaths
Sepsis, including abortions	48
Medical (pneumonia, cardiac disease, chronic nephritis and so forth)	43
Embolism	28
Hemorrhage, including separated placenta and placenta previa	27
Albuminuria and eclampsia, including toxemia	25
Surgical	13
Anesthesia	7
Ectopic pregnancy	3
Transfusion	8
Shock	2
Pernicious vomiting	2
Mesenteric thrombosis	2
Rupture of uterus	9
Nonpuerperal	2
Total	219

In this and subsequent issues of the *Journal*, the various cases will be analyzed briefly under their individual classifications. It must be borne in mind that many cases may be classified under one heading as well as another. For example, in an operative case in which version had been performed and in which the uterus had been ruptured, resulting in peritonitis, the death might be classified by one person as due to sepsis and by another as caused by a ruptured uterus. But an attempt has been made to classify all these deaths under the heading that seems to have been the primary cause.

Sepsis

Of the total number of cases classified as due to sepsis, the astounding number of 23 were caused by criminal or self-induced abortions. The state of Massachusetts would have had a remarkable record if these were not included. Seventeen of the 23 were cases investigated by the medical examiner, but in only 5 was an autopsy performed. The large number of criminal abortions simply emphasizes the serious step that any woman takes who attempts to interfere with a pregnancy that she does not want.

The deaths from cesarean section will be discussed in Dr. DeNormandie's résumé. It is in-

teresting to note that the Waters operation does not always ensure a successful outcome, since 1 patient in whom a Waters had been performed died of general sepsis.

Only 12 cases of sepsis following pelvic delivery were reported. Some of these cases were treated with chemotherapy, which again shows that, although this method of therapy has played an important part in the lowering of maternal deaths due to sepsis, it is not 100 per cent successful.

The review of the patients dying from sepsis leaves one much encouraged, particularly because injudicious operation as a contributing cause of infection was absent. The section has tried to teach conservatism, since it is well known that the more conservative obstetrics is practiced, the less will bungling operation result, with its accompanying infection.

Sepsis as a cause of maternal mortality can be lowered only by a rigorous crusade against the criminal abortionist, by a diminution in the number of cesarean sections done when the indication is not justified, by a continued emphasis on conservatism in all obstetrics, and by earlier recognition of the specific etiology of any infected case so that proper and adequate chemotherapy may be instituted immediately.

WAR ACTIVITIES

CIVILIAN DEFENSE

Medical Handbook No. 2

Organization of Emergency Services for the Care of Civilian Casualties*

PREPARED BY THE MEDICAL DIVISION OF THE MASSACHUSETTS COMMITTEE ON PUBLIC SAFETY AND APPROVED, IN PRINCIPLE, BY THE STATE DEFENSE COUNCILS OF MAINE, NEW HAMPSHIRE, VERMONT, RHODE ISLAND AND CONNECTICUT AND BY THE AMERICAN NATIONAL RED CROSS

1. AIM AND PURPOSE. This handbook outlines a plan for the organization of emergency services for the care of civilian casualties in the event of an enemy attack, which would most probably come in the form of an air raid or sabotage. It also standardizes the medical equipment and personnel necessary for the care of such casualties from the time of injury through convalescence. The plan is flexible and can be adapted to a densely populated metropolitan area or to a rural community.

2. ORGANIZATION OF THE MEDICAL DIVISION. The general organization of the Medical Division of the Massachusetts Committee on Public Safety is shown in Fig. 1. It is headed by a medical director† (and deputy medical director), who is chairman of a central executive committee, which is assisted by various central subcommittees (Fig. 2). Working in conjunction with the director are the regional medical heads, corresponding in number and location to regions (so-called "districts" in publications of the Office of Civilian Defense) specified by the United States Army. They are assisted by deputy regional medical heads. In Massachusetts, there are nine regions (Fig. 3), nine regional medical heads (Fig. 2) and eighteen deputy heads (Table 1), the latter corresponding to the district societies of the Massachusetts Medical Society.

TABLE 1. *Deputy Regional Medical Heads of the Medical Division in Massachusetts, Conforming to the Eighteen District Medical Societies of the Massachusetts Medical Society*

BARNSTABLE Dr. John O. Niles Osterville	MIDDLESEX EAST Dr. Brainard F. Conley 51 Main Street, Malden
BERKSHIRE Dr. Harry G. Mellen 150 North Street, Pittsfield	MIDDLESEX NORTH Dr. Marshall L. Alling 9 Central Street, Lowell
BRISTOL NORTH Dr. Lester E. Butler 148 High Street, Taunton	MIDDLESEX SOUTH Dr. Robert L. DeNormandie 330 Dartmouth Street, Boston
BRISTOL SOUTH Dr. Curtis C. Tripp 416 County Street, New Bedford	NORFOLK Dr. F. William Marlow, Jr. 1284 Beacon Street, Brookline
ESSEX NORTH Dr. Frank W. Snow 24 Essex Street, Newburyport	NORFOLK SOUTH Dr. Daniel B. Reardon 1186 Hancock Street, Quincy
ESSEX SOUTH Dr. Charles F. Twomey 88 Ocean Street, Lynn	PLYMOUTH Dr. Stanley E. Peterson The Checkerton, Brockton
FRANKLIN Dr. Halbert G. Stetson 39 Federal Street, Greenfield	SUFFOLK Dr. Charles F. Wilinsky Beth Israel Hospital, Boston
HAMPDEN Dr. William A. R. Chapin 121 Chestnut Street, Springfield	WORCESTER Dr. James C. McCann 390 Main Street, Worcester
HAMPSHIRE Dr. Edward J. Manwell 16 Center Street, Northampton	WORCESTER NORTH Dr. James G. Simmons 30 Myrtle Avenue, Fitchburg

The functions of the director and his executive group are as follows: to simplify, standardize and integrate all the activities of the Medical Division; to send information and instructions to the regional medical heads and the chief medical officers or their deputies in each community; to assist and maintain a liaison with the other divisions of the Committee on Public Safety, with the Office of Civilian Defense and with the American Red Cross.

The function of the regional medical heads and the deputy regional medical heads is to assist in every way the work of the local medical organizations. They can be of assistance both in setting up the proper type of local medical committees and in helping them establish their organization and facilities. Furthermore, they are responsible for the designation of emergency and base hospitals in all communities of their respective regions. The regional heads and their deputies should go to the local communities and, by example and public addresses, should stimulate the people to organize and equip first-aid

*This handbook is a revised edition of *Medical Handbook No. 1: Organization Medical Division and Care of Injured Civilians*, published by the Medical Division, Massachusetts Committee on Public Safety. The information concerning organization and equipment supersedes that contained in the previous edition.

†The names and addresses of the medical directors for the New England states are as follows: Maine — Dr. Allan Craig, Eastern Maine General Hospital, Bangor; New Hampshire — Dr. Charles H. Parsons, 33 Pleasant Street, Concord; Vermont — Dr. Charles F. Dalton, 2 Colchester Avenue, Burlington; Massachusetts — Dr. Elliott C. Cutler, Peter Bent Brigham Hospital, Boston; Rhode Island — Dr. Joseph C. O'Connell, 215 Thayer Street, Providence; and Connecticut — Dr. George M. Smith, Yale University School of Medicine, New Haven.

parties, medical first-aid posts, ambulance services, medical depots, and emergency and base hospitals.

In each region, the regional medical head is the ranking medical officer, and the deputy heads should assist him in every possible way. When a warning (yellow signal) comes, all should assemble at the regional headquarters; the deputy heads can be of great assistance in disseminating information to emergency and base hospitals and in many other ways. Furthermore, the regional medical heads and their deputies are responsible for lateral communications; that is, the chief medical officer of each community suffering heavy damage should refer his request for additional personnel, supplies and equipment directly to the regional headquarters, rather than to an adjoining township. Finally, each regional head or deputy must provide an alternate to take his place, if necessary.

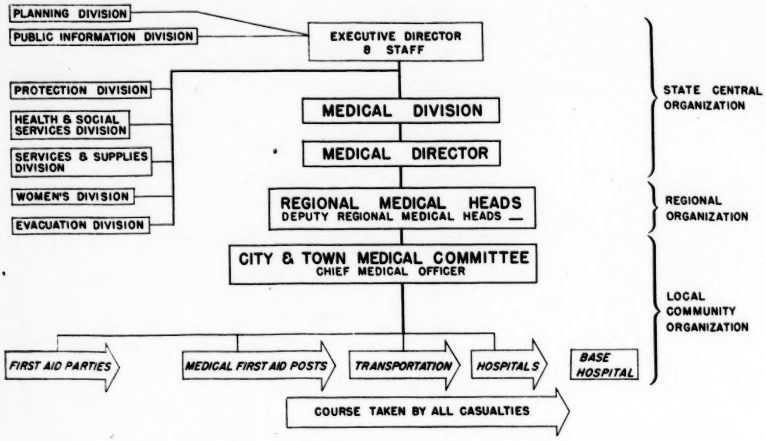

FIGURE 1. *General Organization of the Medical Division.*

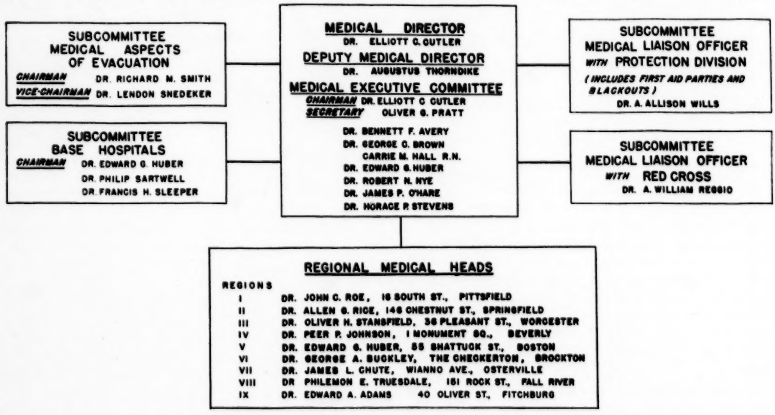
SUBCOMMITTEE MEDICAL ASPECTS OF EVACUATION
CHAIRMAN DR. RICHARD M. SMITH
VICE-CHAIRMAN DR. LENDON SNEDEKER
SUBCOMMITTEE BASE HOSPITALS
CHAIRMAN DR. EDWARD G. HUBER
DR. PHILIP BARTWELL
DR. FRANCIS H. SLEEPER
MEDICAL DIRECTOR
DR. ELLIOTT C. CUTLER
DEPUTY MEDICAL DIRECTOR
DR. AUGUSTUS THORNDIKE
MEDICAL EXECUTIVE COMMITTEE
CHAIRMAN DR. ELLIOTT C. CUTLER
SECRETARY OLIVER G. PRATT
DR. BENNETT F. AVERY
DR. GEORGE C. BROWN
CARRIE M. HALL R.N.
DR. EDWARD G. HUBER
DR. ROBERT N. NYE
DR. JAMES P. O'HARE
DR. HORACE P. STEVENS
SUBCOMMITTEE MEDICAL LIAISON OFFICER WITH PROTECTION DIVISION
(INCLUDES FIRST AID PARTIES AND BLACKOUTS)
DR. A. ALLISON WILLS
SUBCOMMITTEE MEDICAL LIAISON OFFICER WITH RED CROSS
DR. A. WILLIAM REGGIO
REGIONAL MEDICAL HEADS
REGIONS
I DR. JOHN C. ROE, 18 SOUTH ST., PITTSFIELD
II DR. ALLEN G. RICE, 146 CHESTNUT ST., SPRINGFIELD
III DR. OLIVER H. STANSFIELD, 36 PLEASANT ST., WORCESTER
IV DR. PEER P. JOHNSON, 1 MONUMENT SQ., BEVERLY
V DR. EDWARD G. HUBER, 88 SHATTUCK ST., BOSTON
VI DR. GEORGE A. BUCKLEY, THE CHEOKERTON, BROCKTON
VII DR. JAMES L. CHUTE, WIANNO AVE., OSTERVILLE
VIII DR. PHILEMON E. TRUESDALE, 181 ROCK ST., FALL RIVER
IX DR. EDWARD A. ADAMS 40 OLIVER ST., FITCHBURG

FIGURE 2. *Personnel of the Central Organization of the Medical Division in Massachusetts.*

Since the drawing of this chart, Dr. Augustus Thorndike has resigned as deputy medical director and has been replaced by Dr. A. William Reggio, and Mr. Thomas P. Keating has been made a member of the Medical Executive Committee.

3. Local Medical Organizations. These vary according to the size and type of the community. There should be a medical committee in each community, with a physician as chairman, who may serve as the chief medical officer at the report center (so-called "control center" in the publications of the Office of Civilian Defense) or may appoint a deputy for this task. The chief medical officer should have *complete* authority over all medical services in the event of disaster and, as with every other post of the medical organization, should appoint a deputy.

On the medical committees in the large communities, there should be, in addition to the chairman, one individual representing the hospitals, one representing the local board of health, one dentist and one graduate nurse, as well as other representative physicians. It is further desirable that there be a Red Cross liaison officer, a pharmacist and representatives of all agencies within the community that might render medical assistance. Each community can best judge for itself how this group should be set up.

In small communities where there are few physicians and only occasional hospitals, two, three or even four adjoining towns should unite, centering their activities on a hospital common to all and arranging for ambulance transportation of casualties to this point.

4. General Outline for Care of Casualties. The care of civilian casualties begins at the site of disaster. Wardens of the ARP service who have been assigned to first-aid duty will act as *first-aid parties* (so-called "stretcher teams" in the publications of the Office of Civilian Defense), rescuing the injured and directing or transporting them to a *medical first-aid post* or *casualty station*. It is estimated that at least one such post is necessary for each unit of 10,000 inhabitants in any one report-center area. At the medical first-aid post will be physicians, nurses, male and female volunteers trained in first aid, and medical equipment. There, the necessary emergency medical procedures will be carried out. The patient will then be transferred, if necessary, to the designated *emergency hospital* and, later, if necessary, to a *base hospital*.

As previously mentioned, the scheme is flexible, and no set rules for organization can be established, since what should be done in a rural community is obviously different from that in a metropolitan area.

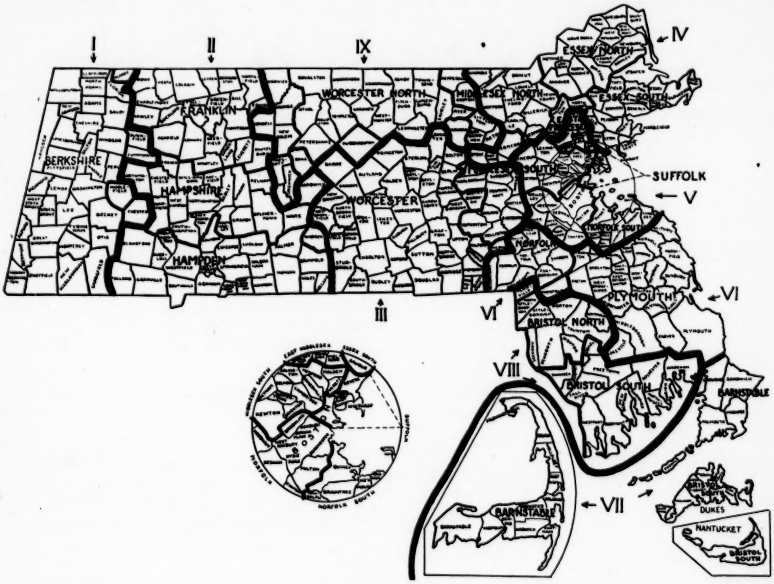

Figure 3. *Map Showing the Boundaries of the Regions and of the District Medical Societies in Massachusetts.*

5. Local Organization for Care of Casualties. Report centers have been established throughout the State, ranging in number from one in small communities to many in large cities (Fig. 4 and Appendix A). If there is more than one report center in a community, the chief medical officer must appoint a deputy chief medical officer to serve as the ranking medical officer in each report-center area.

In the event of a warning (yellow signal) at the report center, the chief medical officer, the Red Cross liaison officer (if available), the chief air-raid warden and his deputy and the heads of the other services are notified and proceed immediately thereto; the members of the mobile medical services — first-aid parties, medical first-aid posts and ambulance service — are immediately ordered by the chief medical officer to the medical depot. At the same time, members of mobile canteens and other relief services are similarly mobilized at the medical depot (relief center). When a report center is notified of an

incident by the post warden, one or more medical-service units, depending on the severity of the damage, proceed immediately, on notice from the chief medical officer, to the scene of disaster. They establish a medical first-aid post in a satisfactory building as near the incident as possible, preferably within 200 yards.

The necessity for the chief medical officer to organize and train the personnel of the first-aid parties and medical first-aid posts to perform as co-ordinated units, not only among themselves but also with the ambulance and

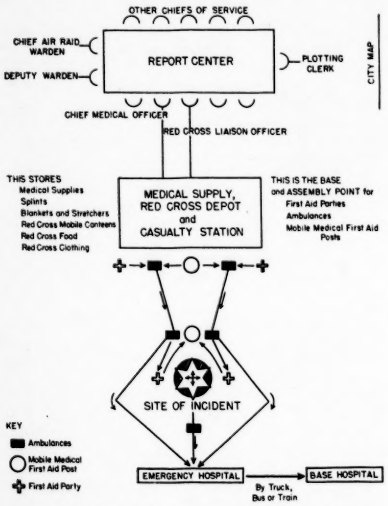

FIGURE 4. *Community Organization at and from the Report Center.*

emergency-hospital services, cannot be too strongly emphasized. Each community is responsible for this organization within its own limits, and the regional medical heads and their deputies should give assistance in creating efficient units. The care of casualties begins at the site where injury takes place. Smooth and rapid handling and co-ordinated treatment from the time the first-aid party removes the casualty is most important, since this reduces mortality and makes a favorable impression on the morale of the general public. Nothing but constant drilling and training can produce a smooth-running organization. A spirit of comradeship and pride in efficiency will develop within the personnel when a sense of purpose and teamwork is attained.

In large metropolitan areas with deputies acting as chief medical officers in the various report centers, the chief medical officer should also appoint a deputy in charge of organizing all the hospitals in his district on a twenty-four-hour basis. Also, in the event of severe and continued bombing, casualties should be evacuated from the emergency hospitals to base hospitals in the country. This is not the responsibility of the chief medical officer; he should report his needs to the regional medical head, who will provide transportation and hospitalization through the evacuation officer.

One of the important duties of the chief medical officer is his relation to the American Red Cross and other relief agencies. Where practicable, there should be a Red Cross representative in each report center, who will assist the chief medical officer. In many report-center areas, the Red Cross will provide, under the direction of the chief medical officer, ambulance service and mobile canteens; it will also furnish food, clothes and temporary shelter to uninjured citizens rendered destitute.

a. Mobile Medical Services. A mobile medical unit consists of two first-aid parties and one medical first-aid post, comprising twenty-four persons, exclusive of the ambulance drivers. Transportation of the equipment and personnel of this unit will require at least four, preferably five automobiles — one passenger car and three, preferably four, ambulances. The chief medical officer is responsible for having these vehicles in readiness. In most report-center areas, the ambulances will be provided by the local Red Cross chapters; however, many commercial ambulance companies, undertakers and others have signified their willingness to supply the necessary vehicles. Following assembly at the medical depot and subsequent notice of disaster, the unit proceeds to the site of the incident.

IDENTIFICATION TAG

Name ..... (Surname) (Given name)

Address .....

Age .....

Male ☐ Female ☐ Catholic ☐ Protestant ☐ Jewish ☐ Single ☐ Married ☐ Widowed ☐ White ☐ Negro ☐ Other ☐

Person to be notified:

Name .....

Address .....

Phone ..... **Relation** .....

Where tagged .....

Date ....., 194.... **Hour** ..... **M.**

Diagnosis:

Treatment given:

Morphine ..... **Tourniquet** .....

Where sent .....

Signed .....

Organization .....

16—28181 b-o

FIGURE 5. *Identification Tag.*

b. First-Aid Parties. A first-aid party comprises six ARP wardens, assigned to first-aid duty, who operate under the commanding officer of the medical first-aid post. Each must have taken one of the first-aid courses

given by the American Red Cross and should be thoroughly trained as a stretcher bearer; he is equipped with a first-aid kit belt (Appendix B), and the party obtains stretchers and blankets from the medical first-aid post. The party should attach and fill out identification tags (Fig. 5), should give emergency medical care (first aid only) and should either transport the wounded by stretcher to the medical first-aid post or direct the walking to this post or to a casualty station (usually located at the medical depot). A casualty should *not* be taken, sent or directed to an emergency hospital unless it is so ordered by a physician from the medical first-aid post.

c. Medical First-Aid Posts. The personnel consists of two physicians, two graduate nurses, and four female and four male volunteers who have had Red Cross first-aid training and who can act as assistants and as stretcher bearers. One of the physicians should be made the commanding officer, with the responsibility of dispatching the first-aid parties to collect casualties, receiving and treating the wounded, and dispatching the ambulances to the emergency hospital.

The medical first-aid post requires at least two rooms, preferably with running water in each. The walking wounded should be directed to one of these rooms (or to the medical depot or other places equipped and staffed to function as casualty stations), and the stretcher cases should be taken to the other. Portable wooden or metal horses should be part of the equipment (kitchen tables, chairs and so forth can be improvised); on these, the stretcher should be placed, so that the patient can be splinted or given further medical treatment without being moved off the stretcher.

A chest (Fig. 6) containing the medical first-aid post supplies, and all other equipment (Appendix C), should be kept in a designated spot, preferably the medical depot, and

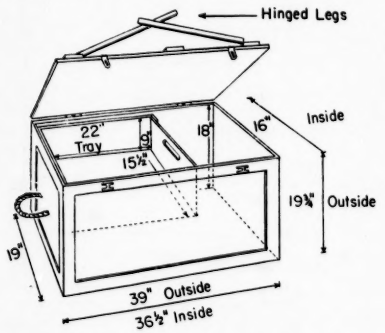

FIGURE 6. *Box for Storage of Supplies, Instruments and Drugs of a Medical First-Aid Post.*

should be transported by the ambulances when the mobile medical unit is ordered out. Each post should be equipped with at least three powerful electric lanterns operated by dry cells (for example, Red Bird lanterns), as well as with suitable material for blackout.

When the medical first-aid post is established, one member of this unit (preferably one of the female first-aid volunteers) should act as *registrar*. The wounded will enter with identification tags tied on by the first-aid party, on which certain data are to be written; these tags are supplied to each medical first-aid post, as well as being in the kit belts of the first-aid parties. If the tag was not put on by the first-aid party, it must be attached and filled out at the first-aid post by the registrar; if only partly filled out, it must be completed. An additional official record must be kept by the registrar of each post, preferably in a *book*; and this must be turned in to the chief medical officer at the end of each tour of duty. The record should be brief but must include everything on the tag and a short account of the treatment, especially the administration of drugs, and of the disposition of the case.

Each medical first-aid post should have a duplicate or, preferably, triplicate personnel, so that service can be maintained on a twenty-four-hour basis, in twelve-hour or eight-hour shifts; even duplicate or triplicate sets of supplies and equipment may be provided.

d. Medical Depots. One or more medical depots are located in each report-center area. Fire stations, police stations and school buildings are suitable sites. There, the supplies and equipment of the first-aid parties, medical first-aid posts and casualty stations, for which the chief medical officer is responsible, are stored, and there, the personnel of these units and ambulances assemble in times of emergency. It will also be used by the Red Cross for the storage of its medical supplies. The officers in charge of medical depots need not be physicians — pharmacists or employees of medical-supply houses are quite suitable.

In densely populated areas, this depot may be used as a casualty station for the care of the lightly wounded, since it is desirable not to crowd the medical first-aid posts or the emergency hospitals with such minor cases. Furthermore, portions of the same building or adjacent buildings should serve as an assembly station for the Evacuation Division, and as a base for mobile canteens and a storehouse for the supplies and equipment required by the Red Cross for the clothing, feeding and housing of uninjured but destitute citizens.

Exchange of equipment between first-aid parties and medical first-aid posts will proceed as equipment is used. First-aid parties will go into a demolished area with their stretchers, blankets and first-aid kits. They will evacuate the wounded to the medical first-aid post, leaving the stretchers and blankets. There they will pick up reserve supplies of stretchers and blankets and, if necessary, gauze supplies for their emptied kit belts and will return to the scene of disaster to evacuate other casualties.

Auxiliary medical depots should be established in every emergency hospital for the interchange of stretchers, blankets and splints. When an ambulance evacuates stretcher cases with Keller–Blake or Murray–Jones splints from a medical first-aid post to an emergency hospital, the driver picks up at the hospital an equivalent number of stretchers, blankets and splints and returns to the medical first-aid post. The chief medical officer must see to it that such supplies are adequate at all times in all places and should replenish these supplies from the medical depot.

Although equipment must be exchanged, there should be *no* change in the assignments of medical, nursing and other personnel, other than relief after eight or twelve hours of continuous duty.

e. Auxiliary Emergency Medical Depots. The National Pharmaceutical Association and some of the state pharmaceutical associations, including Massachusetts, have offered to provide certain drugstores with supplies for the emergency use of physicians and first-aid-trained ARP wardens. It has been suggested that such stores be designated by

an appropriate window sign, such as "Emergency Medical Depot"; they will have a cabinet where compress bandages, triangle bandages and supplementary wooden splints are stored.

f. Casualty Stations. In metropolitan areas, the chief medical officer may deem it advisable to establish casualty stations for the treatment of the less seriously wounded. These may be located at the medical depots, as previously mentioned, or at other strategic sites; emergency hospitals should *never* be used for this purpose. As at the medical first-aid posts, a record of all casualties must be kept and turned in daily to the chief medical officer.

g. Transportation. Transportation of the personnel and equipment of the first-aid parties and medical first-aid post to the scene of disaster is provided by passenger cars and ambulances, and that of the seriously wounded from the first-aid post to the emergency hospital by ambulances. When ordered by the chief medical officer, the drivers report to the medical depot with their cars. If a sufficient number of ambulances are not available through the Red Cross or otherwise, the chief medical officer must provide for additional vehicles, with drivers. So far as possible, police-department and fire-department ambulances should not be used, since they will probably be needed for other emergency purposes. The commanding officer of the medical first-aid post is responsible for the evacuation of patients to the emergency hospital. The ambulances should be operated by the shuttle system, whenever possible.

Beach wagons and one-ton or one-and-a-half-ton panel-body delivery trucks may be converted for ambulance use. In fact, any kind of delivery vehicle or small truck on the floor of which can be placed two stretchers will serve the purpose.

Two drivers should be detailed to each ambulance, and both should be trained in first-aid care. Members of the Red Cross Motor Corps and women trained by the Women's Civilian Defense School have had such training, in addition to experience in convoy duty and driving under blackout conditions.

h. Emergency Hospitals. In each community, the medical committee should organize the existing hospitals for casualty service. This means that the staff physicians, dentists and nurses should be allocated to two twelve-hour or three eight-hour shifts. Small communities should be so organized, as previously mentioned, that the nearest hospital is available. All hospitals used as emergency hospitals should increase their supplies of medical material and of permanent food, such as canned goods. Such hospitals should also carefully study the blackout regulations outlined in two manuals, *Blackout Information to the General Public* and *Blackout Information, Lighting and Ventilation for Industrial Plants and Commercial and Public Buildings*, compiled by the Protection Division of the Massachusetts Committee on Public Safety, and in a booklet, *Protective Construction Series No. 1: Glass and glass substitutes*, issued by the Office of Civilian Defense, Washington, D. C., and equip themselves for such an event. In the large centers, the hospitals should begin the training of nurses' aides, preferably under the new Red Cross system, in which a satisfactory preliminary training can be given to volunteers from the lay public. Once such training has been completed, the volunteer nurses' aides should keep in practice by periods of active duty in the hospital every three or four months or by continuous service.

An experienced surgeon should be in charge of the disposition of all casualties brought to the hospital by ambulance.

All emergency hospitals should be equipped with the necessary furnishings for two, preferably three, operating rooms for seriously injured cases, with operating teams, anesthesia service and nursing personnel so that at least two, preferably three, operations may be carried on at the same time. If an air raid occurs in any sizable community, the emergency hospital is expected to double or triple the personnel so that the operating rooms may be used on continuous twenty-four-hour service (either twelve-hour or eight-hour shifts). This service is essential but will vary somewhat with the size and population of the community. In urban areas, it is essential that the hospital have protected operating rooms with independent lighting systems, preferably in the basement, where they will be protected from bomb splinters and broken glass and where they may function undisturbed.

In urban areas, all casualties should be prepared for evacuation to a base hospital the next day, if the circumstances warrant.

The emergency hospitals, as previously stated, must have available at the ambulance entrance an adequate supply of stretchers, blankets and splints, to interchange supplies with incoming ambulances. Such supplies should be obtained from the medical depot.

In large and moderately sized hospitals, outpatient-department facilities must be made available, on a twenty-four-hour basis, for the less seriously injured ambulatory casualties (walking wounded) who have not been to a medical first-aid post. The flow of patients should be arranged on a one-way-traffic basis so that large numbers can be handled without confusion, and an experienced surgeon should be in charge, since many apparently minor injuries may be extensive and severe. Those with minor injuries should be evacuated to their homes, whenever possible, but should receive clinic treatment daily until ready for discharge to full employment or civilian life. In the metropolitan areas, special dressing stations may be set up or the casualty stations used for the care of those who are ambulatory.

Members of permanent hospital staffs should not be used as personnel in medical first-aid posts, because in an emergency they will be more necessary at their hospitals.

All emergency hospitals, on orders from the chief medical officer, should discharge to their homes, to previously designated convalescent homes or to base hospitals as many of their regular patients as possible — this should mean about 50 per cent of the census. Furthermore, the emergency hospitals should acquire sufficient cots, blankets, splints, drugs and other medical supplies to provide for 25 per cent more than the average census.

6. Base Hospitals. As soon as possible after adequate surgical care has been completed, all casualties in emergency hospitals should be evacuated to large hospitals in the country, chiefly sanatoriums and hospitals under state control. This evacuation of patients will be accomplished by truck, bus or train, and will be supervised by the regional medical head or a deputy appointed by him.

7. Medical Aspects of Evacuation. In any disaster only a portion of the population in the area will be injured, but many others will be rendered homeless and frightened. The latter may need clothing, temporary shelter and an opportunity to reunite their families or to plan for the future; furthermore, serious medical conditions may arise. The medical care of the noninjured civilian population is the responsibility of the Evacuation Division, which has its own medical organization, distinct from the Medical Division but working in close co-

operation with it. At regional and local levels similar liaison should obtain between these two medical groups. Food, clothing and temporary shelter for these refugees will be provided by the American Red Cross.

Evacuation of the civilian population involves more than emergency service at the time of disaster. People living in areas near military reservations or on islands may have to be moved to less dangerous regions; other areas may be within the theater of military operations. In any large-scale preplanned evacuation, preference would have to be given to mothers and children, the aged, the infirm and the handicapped. Such groups would necessarily create special medical problems in areas to which they might be evacuated. Educational, recreational and social-service facilities would have to be provided, together with the appropriate personnel, by arrangement with the Division of Health and Social Service. The organization to meet the various situations and the medical responsibilities entailed are described in bulletins and manuals prepared by the Evacuation Division. Reception areas will be established to which evacuees will be sent. At these points, medical care of the evacuees will be provided by the Evacuation Division until the emergency is over.

8. Decontamination. The control and care of gassed individuals who are not wounded will be handled by a special unit of the Protection Division. Men who have been instructed in marking out contaminated areas and in the care of burned and gas-contaminated patients will be detailed for this work. Those who wish to study the methods of decontamination in detail should consult the special pamphlet on gas defense that has been issued by the Protection Division.

From the point of view of the Medical Division, it must be clearly understood that nonwounded gassed patients should *not* be routed to emergency hospitals. The commanding officer of the medical first-aid post should send all gas casualties, after whatever emergency surgical care is necessary, to a decontamination center. This will avoid overcrowding the hospitals with people who usually need only a bath and change of clothing, and will prevent further contamination of valuable personnel with gas; furthermore, the hospitals could not possibly handle this type of casualty without considerable addition to personnel and equipment.

9. Care of the Dead. Proper disposition of the dead is important from the point of view of morale of the general public and of the mobile medical units and emergency hospitals. Arrangements should be made with the local medical examiner for the immediate removal of the dead. The ARP wardens should segregate the dead from the injured, and should send the former, not to a medical first-aid post or to a hospital, but to a center previously designated by the medical examiner, transportation being accomplished by ambulance. So far as possible, the dead should be kept from view. It is a surprisingly favorable commentary on the system in London that few people there have seen many dead casualties, in spite of heavy loss of life.

* * *

Appendix A. *Data Concerning Report Centers, Medical First-Aid Posts, First-Aid Parties, Ambulances and Medical Depots in a Large City.*

The following is the proposed setup in Boston, with a population of about 840,000.

Report Centers. Twelve report centers will be established.

Medical First-Aid Posts. On the basis of 1 medical first-aid post for each 10,000 inhabitants, there should be approximately 84 posts, or 7 posts attached to each report center.

First-Aid Parties. On the basis of 2 first-aid parties for each medical first-aid post, there should be approximately 168 parties, or 14 parties attached to each report center.

Ambulances. On the basis of 3 (preferably, 4) ambulances for each mobile medical unit (1 medical first-aid post and 2 first-aid parties), there should be approximately 252 (preferably, 336) ambulances, or 21 (preferably, 28) ambulances serving each report center. (As a matter of fact, this large number of ambulances is unnecessary in such a densely populated region, since it is extremely unlikely that all areas would be hit at any one time and since the exchange of ambulances from one report center to another is easily accomplished.)

Medical Depots. Since each report center should have at least 1 medical depot, there will be a minimum of 12 medical depots. The medical depot or depots in each report center might be called on to supply 7 medical first-aid posts, 14 first-aid parties and 21 (preferably, 28) ambulances.

Appendix B. *Contents of Kit Belt for First-Aid Party.*

A first-aid kit belt contains the following:

1 pkg. Bandage compresses, 2 in., 4 per pkg.
1 pkg. Bandage compresses, 3 in., 2 per pkg.
2 pkg. Bandage compresses, 4 in., 1 per pkg.
1 yd. Gauze, absorbent
1 Bandage, gauze, 4 in.
2 Bandages, cravat triangle, nonsterile
1 pkg. Adhesive compresses, 1 in., 16 per pkg.
2 pkg. Tannic acid jelly
1 pr. Scissors
1 pr. Tweezers
1 Lipstick, red (for marking tourniquet cases)
1 Pencil, indelible (for identification tags)
10 Tags, identification.

The first six items will be supplied by the American Red Cross; applications should be made to the First Corps Area Emergency Office, 161 Massachusetts Avenue, Boston.

Appendix C. *Supplies, Instruments, Drugs and Equipment of a Medical First-Aid Post.*

The supplies, instruments, drugs and equipment of a medical first-aid post are as follows:

Supplies

6 pkg. Red Cross "units," 2 gauze kits and 2 table covers per pkg.
2 pkg. Towels, 12 per pkg.
2 pkg. Bandages, gauze, 2 in., 12 per pkg.
2 pkg. Bandages, gauze, 3 in., 12 per pkg.
2 pkg. Slings, 6 per pkg.
1 pkg. Binders, scultetus, 4 per pkg.
1 roll Tape, adhesive, 1 in., 10 yd.
1 roll Tape, adhesive, 2 in., 10 yd.
1 box Throat sticks, wood, 10 per box
2 Mouth gags, wood
12 ft. Rubber tubing (for tourniquets)
5 rolls Cotton, absorbent, 1 lb. each
1 box Pins, safety
24 rolls Sheet wadding, 24 in.
4 pr. Gloves, rubber, Sizes 7½ and 8

4 Catheters, urethral, No. 14 Fr.
50 Cups, waxed-paper
12 Splints, basswood, 30 x 3½ x 3/16 in.
4 Brushes, nail
6 cakes Soap
2 boxes Matches
1 Lipstick, red
1 Pencil, indelible
200 Tags, identification

INSTRUMENTS

2 Scissors, Mayo, curved, 6 in.
2 Knife handles, Bard–Parker No. 3
12 Blades, Bard–Parker No. 10
6 Snaps, straight, 5½ in.
6 Snaps, curved, 6¼ in.
4 pr. Forceps, toothed, 6 in.
2 pr. Forceps, smooth, 6 in.
12 Needles, Keith
12 Needles, full curved, Ferguson or Mayo, ¾-in. curve
50 tubes Ties, black silk, sterile (No. 4, Gudebord)
6 tubes Sutures, catgut, sterile, No. 1 plain
12 tubes Sutures, catgut, sterile, No. 1 chromic
2 Shears, bandage, 7½ in.
2 Syringes, Luer, 2 cc.
12 Needles, hypodermic, 25 gauge
6 Flashlights, pencil type
1 Blood-pressure apparatus
1 Stethoscope
1 "Airway" tube, Connell, large (3¾ x 7/8 x 3/8 in.)
1 "Airway" tube, Connell, small (2¼ x 3/4 x 3/8 in.)
2 Retractors
1 Tube, tracheotomy
1 Razor, safety, with 20 blades
1 Razor, straight
1 Stove (No. 520, Coleman)
3 Lanterns, electric, dry-cell type (Red Bird)
2 Batteries, extra (for lanterns)

DRUGS

50 pkg. Sulfanilamide, powder, sterilized, 4 gm. each
50 pkg. Sulfathiazole, powder, sterilized, 4 gm. each
1 qt. Alcohol, 70 per cent
2 bot. Morphine sulfate, sterile solution, 20 cc. each, with rubber-diaphragm stopper (1 cc. contains ¼ gr. morphine sulfate)
12 amp. Nikethamide, 1.5 cc. each
2 pkg. Chlorinated lime mixture, dry, in air-tight tin, each containing:

Chlorinate lime (30 per cent chlorine)	200 gm.
Sodium bicarbonate	200 gm.
Sodium carbonate, C.P., anhydrous	80 gm.

For use, mix a portion of the dry powder in the hands with sufficient water to form a thin cream; 4 minutes' rubbing with this cream is equivalent to 20 minutes' scrubbing.

1 bot. Aromatic spirits of ammonia, 2 oz.
6 pkg. Tannic acid jelly, 2 oz. each.
6 tubes Vaseline, white, 2 oz. each
1 qt. Gasoline, in nonleaded can (for stove)

EQUIPMENT

4 Trays, solution, 3 in. deep, nested
1 Sterilizer, enamel, with cover (to nest with trays)
2 Pails, galvanized, 10 qt.
2 Sheets, rubber, 72 x 25 in.
2 Aprons, rubberized
Blackout fabric
2 Tables, folding, 30 x 30 in.
2 Horses, wood or metal
6 Stretchers
12 Blankets
6 Splints, leg, Keller–Blake
6 Splints, arm, Murray–Jones
1 Medical first-aid post marker.

All supplies, instruments and drugs are best packed in a wooden chest with rope handles (Fig. 6), although bags of waterproof material or fiber suitcases will suffice.

The first six items of equipment can be packed in a duffle bag, and the remaining items should be placed in the ambulances in the most convenient places.

BOOK REVIEWS

Clinical Practice in Infectious Diseases for Students, Practitioners and Medical Officers. By E. H. R. Harries, M.D. (Lond.), M.R.C.P., D.P.H. With a foreword by W. Allen Daley, M.D. (Lond.), F.R.C.P., D.P.H. 8°, cloth, 468 pp., with 31 illustrations, and 28 tables. Baltimore: Williams and Wilkins Company, 1940. $6.00.

This is an up-to-date, trustworthy manual of the acute infectious diseases. After preliminary considerations of infection and resistance, transmission, serum sickness, general diagnosis and management, and the like, the individual maladies are considered in the usual fashion — definition, cause, clinical picture, pathology, complications, treatment, prevention, if any, and general management from the point of view of public health. The public-health laws to which reference is made are, of course, British and not American.

This book will be most useful perhaps to the student brushing up or to the general practitioner venturing so little into these fields that he finds himself growing a bit rusty.

A Primer for Diabetic Patients: An outline of treatment for diabetes with diet, insulin and protamine-zinc insulin, including directions and charts for the use of physicians in planning diet prescriptions. Seventh edition, reset. By Russell M. Wilder, M.D. 12°, cloth, 184 pp., with 11 tables, 7 illustrations and 1 plate. Philadelphia: W. B. Saunders Company, 1941. $1.75.

The seventh edition of this excellent manual emphasizes the combination of protamine-zinc insulin and regular (or crystalline) insulin in one injection. Definite rules for the adjustment of insulin doses are given, which provide for reduction of dose as improvement occurs. While insulin is being used, Wilder encourages the patient to permit traces of sugar in the urine at all times, to avoid reactions. Average diets contain not more than 167 gm. carbohydrate. Low-fat and undernutrition diets are avoided. Directions for the management of coma, hypoglycemia and other complications are included. Both physician and patient will find the book most useful.

Hydrotherapy in Psychiatric Hospitals. By Rebekah Wright, M.D. 8°, cloth, 334 pp., with 91 illustrations. Boston: The Tudor Press, 1940. $4.00.

This book is a revision of *Hydrotherapy in Hospitals for Mental Diseases*, published in 1932 by the same author. Dr. Wright has rearranged the text, added descriptions of a few new procedures, and inserted more illustrations.

The first part of the book is meant for physicians who prescribe hydrotherapy in psychiatric hospitals. The second part, directed to nurses and hydrotherapists, presents detailed descriptions of technics utilized in applying cold packs, continuous baths, irrigations and other forms of hydrotherapy so frequently made use of in mental hospitals.

The author is director of hydrotherapy for the Massachusetts Department of Mental Health, and physicians working in psychiatric hospitals in Massachusetts have been familiar with her work for a long time. The technics that she describes are standard procedures in the state hospitals.

Physicians interested in utilizing hydrotherapy in the treatment of their patients will be glad to see this revision of Dr. Wright's book.

Modern Dermatology and Syphilology. By S. William Becker, M.D., and Maximillian E. Obermayer, M.D. 4°, cloth, 871 pp., 461 illustrations and 32 colored plates. Philadelphia: J. B. Lippincott Company, 1940. $12.00.

Several unusual and acceptable features appear in this book. In the first place, the functional aspects of skin disease are emphasized. Secondly, it is less encyclopediac than most of the textbooks on dermatology, unusual diseases and tropical diseases being hardly mentioned. On the other hand, more space has been allotted to the commoner and more important dermatoses. The term "eczema" is not used, but there is a thorough discussion of the effects of external agents on the skin under the headings of "Toxic Dermatoses," and of the effects of internal factors and of certain functional diseases of the skin under the title "Neurodermatoses." In the latter group are included the following: idiopathic pruritus of various types, neurotic excoriations, neurodermatitis, dyshidrosis, chronic urticaria and alopecia areata. The authors have made a real contribution to dermatology by their investigations of this group and in frequently indicating their relation to other functional diseases, such as colitis, rhinitis and migraine. In fact, the general relations of skin disease to the bodily economy are emphasized throughout the book, in accordance with the authors' statement, "Its diseases are reflected in changes in other parts of the organism and it often mirrors internal diseases."

The chapter on pigmentary diseases is another outstanding contribution. Becker has done much investigative work with pigment, and the classification of pigmentations at the beginning of the chapter and the discussion of these diseases present the opinion of an authority on the subject.

Each chapter contains a paragraph of explanation that discusses the relation of the subject of the chapter to other subjects or brings out points of general interest concerning the subject under consideration.

Therapy is discussed in the introductory chapter, with a formulary and explanations of individual therapeutic procedures. In the discussion of the therapy of an individual dermatosis, the lists of procedures detailed by previous authors are often less complete than those in the usual textbooks. However, the authors discuss treatment from their experience with patients at the University of Chicago clinics. In the management of the functional dermatoses, their method is given in considerable detail; this has been of decidedly practical value, and should be helpful to the average physician in the handling of such cases. The discussion of syphilis is especially full and reviews the general manifestations of the late type and their therapy in more detail than the average dermatologic text.

Excellent photographs supplement the text, and of particular value are the color plates, which are indispensable in the presentation of skin manifestations. Of value also are the tables on cutaneous lesions, lists of etiologically important plants, weeds and trees, and lists of patch-test dilutions and drugs.

Taken altogether, the title is well chosen, and a modern viewpoint of dermatology is well presented, particularly in the four introductory chapters on the neurodermatoses, the pigmentary diseases, therapeutic methods and syphilis.

Electrocardiography, Including an Atlas of Electrocardiograms. By Louis N. Katz, M.D. 4°, cloth, 580 pp., with 420 engravings, including 806 electrocardiograms. Philadelphia: Lea and Febiger, 1941. $10.00.

Exercises in Electrocardiographic Interpretation. By Louis N. Katz, M.D. 4°, cloth, 222 pp., with 128 engravings, containing 189 electrocardiograms. Philadelphia: Lea and Febiger, 1941. $5.00.

These two volumes supplement each other, the latter furnishing illustrations for practice in applying the principles of the former. The textbook itself, however, is lavishly illustrated, and it amply confirms the claim that it contains "an atlas of electrocardiograms." The combination of these books really constitutes a complete course of clinical electrocardiography and justifies their high cost.

The plan of the larger volume consists of a division into three main sections, with sixteen chapters and a separate bibliography for each section. The sections are, "Theory of Electrocardiography," "Systematic Description of the Electrocardiographic Contour" and "Systematic Description of the Electrocardiogram in the Arrhythmias."

The first section gives an excellent background in the bioelectric phenomena involved in electrocardiography. Because of his own investigations, the author has deserted to a considerable degree the principle of vector analysis of these phenomena. This remains disputed ground but alters little the clinical aspects of the subject. Anatomy and physiology are adequately considered, and the illustrations are excellent. The place of the electrocardiogram in clinical practice is defined, and one sentence might be framed in the conscience of each practitioner of this art: "In short, the electrocardiograph is not a tool for the unscrupulous, or a plaything for the erudite, nor is it an instrument of precision which replaces the ordinary clinical examination."

The second and third sections may also be approved without important reservations. The precepts are sound, and the examples carefully selected. Clinical relations, electrocardiographic findings in various diseases and the influence of digitalis are emphasized, as is the therapy of the various arrhythmias. A preponderant space is properly given to coronary heart disease.

The so-called "exercises" consist of 90 unknown cases with electrocardiograms from which interpretations are made and correlated with the clinical data. When helpful in the analysis, serial tracings on the same patient are shown. In each case, the electrocardiogram is illustrated and studied under the following headings: description, interpretation, clinical story and correlation. Preceding the unknown cases is a short section on the technic of the approach to an electrocardiogram, and the steps necessary in its analysis. For this reason alone, the volume is useful to one with some knowledge of the subject, particularly for a review of his own interpretations in the light of the most recent cardiovascular knowledge.

The reviewer recommends the work wholeheartedly. It demonstrates, beyond question, not only that electrocardiography is of great practical importance, but also that it is a lively and developing science.

(Notices on page x)